

Cyanogen Ethylation of Methyl- and Ethyl Dichlorosilanes

62-12-13/20

ASSOCIATION: Institute for Organic Chemistry AN USSR imeni N.D.Zelinskiy  
(Institut organicheskoy khimii im. N.D. Zelinskogo Akademii nauk  
SSSR).

SUBMITTED: July 5, 1957

AVAILABLE: Library of Congress

Card 2/2 1. Alkyl-dichlorsilylpropionnitriles-Titration 2.  $\beta$ -methyl-  
dichlorosilylpropionnitriles-Structure-Pyridine catalyst

448

V DORIN, V M

AUTHORS:

Petrov, A. D., and Vdovin, V. M.

TITLE:

Synthesis of 1,1-Diphenyl-4 (or 4,4-)-Alkyl (or Aryl)-Alkanes from 3,3-Diphenyl-butyronitrile (Sintez 1,1-difenil-4 (ili 4,4)-alkil (ili aril)-alkanov cherez 3,3-difenilbutironitril)

PERIODICAL:

Zhurnal Obshchey Khimii, 1957, Vol. 27, No. 1, pp. 45-48 (U.S.S.R.)

ABSTRACT:

Referring to the A. D. Grebenyuk and I. P. Tsukervanik report (2) in which the Friedel/Crafts reaction was applied to beta-chloropropionitrile, chlorobenzene and even benzene the authors condensed beta-trichloromethylpropionitrile with benzene according to equation  $\text{ClC}_6\text{H}_5 + \text{ClCH}_2\text{CH}_2\text{CN} \xrightarrow{\text{AlCl}_3} \text{ClC}_6\text{H}_4\text{CH}_2\text{CH}_2\text{CN}$  and obtained 3,3-diphenylbutyronitrile - a suitable raw material for the synthesis of homologous acid and different ketones - intermediate products of hydrocarbon synthesis. Efforts were also made to introduce certain Grignard reagents into the reaction with  $\text{Cl}_3\text{CCH}_2\text{CH}_2\text{CN}$  but the reaction was not as anticipated and the condensation products obtained were not soluble in ether. A method of obtaining asymmetric alkyl/aryl hydrocarbons of the 1,1-diphenyl-4(or4,4)alkyl(or aryl)-alkanes from 3,3-diphenylbutyronitrile, is described.

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Synthesis of 1,1-Diphenyl-4 (or 4,4)-Alkyl(or Aryl)-  
Alkanes from 3,3-Diphenyl butyronitrile

There are 4 references, of which 1 is Slavic

ASSOCIATION:

Academy of Sciences USSR, Institute of Organic Chemistry  
(Institut Organicheskoy Khimii, Akademii Nauk SSSR)

PRESENTED BY:

SUBMITTED:

January 9, 1956

AVAILABLE:

Card 2/2

V4

5(3)

AUTHORS:

Petrov, A. D., Vdovin, V. M.

SOV/62-58-11-15/26

TITLE:

Synthesis and Properties of  $\alpha$ -Cyanoisopropoxy Silanes and  $\alpha$ -Cyanoisopropoxy Chloro Silanes - Communication 2.  
(Sintez i svoystva  $\alpha$ -tsianizopropoksisilanov i  $\alpha$ -tsianizopropoksikhlorosilanov - Soobshcheniye 2.)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1958, Nr 11, pp 1366-1371 (USSR)

ABSTRACT:

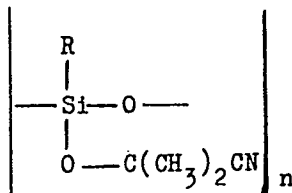
In the present paper the authors studied the following problems: 1) Effect of the structure of alkyl-(aryl)-chloro silanes on the yield of their mono-, di-, and tri- $\alpha$ -cyanoisopropoxy derivatives with a lack of acetone cyanohydrin at room temperature. 2) The behaviour of various cyanoisopropoxy silanes towards hydrolyzing agents in the presence and absence of pyridine. 3) The behaviour of dialkyl- $\alpha$ -cyanoisopropoxy chloro silanes towards the Grignard (Grin'yar) reagent. In this connection the synthesis of 13 different  $\alpha$ -cyanoisopropoxy silanes was carried out for the first time. It was demonstrated that in the case of a lacking of acetone cyanohydrin the character of the radicals linked with silicon determines the number of the

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Synthesis and Properties of  $\alpha$ -Cyanoisopropoxy Silanes and  $\alpha$ -Cyanoisopropoxy Chloro Silanes - Communication 2.

SOV/62-58-11-15/26

$\alpha$ -cyanoisopropoxy groups migrating to the silicon atom. Conditions were found under which a new form of polysiloxanes of the type



can be obtained. In the case of compounds of the type  $R_m Si[OC(CH_3)_2CN]_n$ , where  $n = 1, 2, 3$  and  $m + n = 4$ , a considerable stability to hydrolysis was observed. There are 2 figures, 3 tables, and 4 references, 1 of which is Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

Card 2/3

AUTHORS: Vdovin, V. M., Petrov, A. D.

SOV/79-28-10-46/60

TITLE: Synthesis of the Alkenyl- $\alpha$ -CN-Isopropoxy Silanes (Sintez alkenil- $\alpha$ -CN-izopropoksisilanov)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 28, Nr 10, pp 2842 - 2845 (USSR)

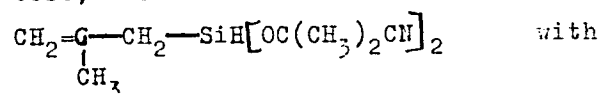
ABSTRACT: The interest in these silanes (Refs 1-3) is explained by the easy introduction of the CN-containing radical into the molecule of the organosilicon compound. Besides, they are stable with regard to a hydrolysis of the Si-O bond (Refs 2,3). In the paper under discussion, the authors report on the synthesis of the  $\alpha$ -CN-isopropoxy silanes which contain unsaturated radicals and which are also to be employed in the synthesis of the organosilicon polymers containing the CN-group. Most important in this connexion were the alkenyl- $\alpha$ -CN-isopropoxy silanes and the alkenyl- $\alpha$ -CN-isopropoxy-hydride silanes (Refs 4,5,6). The alkenyl-chloro silanes and alkenyl-hydride-chloro silanes used as initial products, were prepared according to references 7,8,9. In a reaction with cyanohydrin acetone, these chloro

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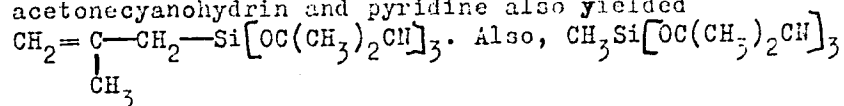
Synthesis of the Alkenyl- $\alpha$ -CN-Isopropoxy Silanes

SOV/79-26-10-46/60

silanes were converted into the corresponding  $\alpha$ -CN-isopropoxy silane derivatives (Reaction Scheme 1). Contrary to expectations, alkenyltri- $\alpha$ -CN-isopropoxy silanes were obtained, in addition to the expected alkenyldi- $\alpha$ -CN-isopropoxy-hydride silanes, in the reaction of the allyl- and methallyl-dichloro silanes with cyanohydrin acetone and pyridine. In the control test, the reaction of



acetonecyanohydrin and pyridine also yielded



was obtained from  $\text{CH}_3\text{SiCl}_2\text{H}$ , in accordance with scheme 2.

For the attempts to introduce the allyloxy radical into the molecule of the alkyl- $\alpha$ -CN-isopropoxy-chloro silanes, and their results, vide schemes 3 and 4. There are 1 table and 10 references, 6 of which are Soviet.

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Synthesis of the Alkenyl- $\alpha$ -CH-Iso-propoxy Silanes

SOV/79-28-10-46/60

ASSOCIATION: Institut organicheskoy khimii Akademii nauk SSSR (Institute of Organic Chemistry of the Academy of Sciences, USSR)

SUBMITTED: July 8, 1957

Card 3/3



5(3)

SOV/62-59-5-33/40

AUTHORS: Petrov, A. D., Vdovin, V. M.

TITLE: On the Interaction Between Symmetric Tetraalkyldisiloxanes With Dialkyl-dialkenylsilanes and Symmetric Tetraalkyl-di-alkenyldisiloxanes (O vzaimodeystvii simmetrichnykh tetra-alkildisiloksanov s dialkildialkenilsilanami i simmetrichnymi tetraalkildialkenildisiloksanami)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 5, pp 939-941 (USSR)

ABSTRACT: In earlier papers (Refs 1-3) it had been shown that under the action of platinized carbon and heating for several hours in dialkylsilanes an intermolecular hydrogen- and alkenyl condensation takes place. Biradical formed hereby results in a polymer with silicon atoms in the basic chain. This kind of polymerization is based upon the specific effect of platinum catalysts. In this connection the intermolecular condensation reaction of the compounds mentioned in the title was investigated under the influence of the catalyst  $H_2PtCl_6$ . It was found that both reactions developed very easily and within a few minutes. They were highly endothermic and polymers were formed with different ratios of silicon hydrocarbon bridges and

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SOV/62-59-5-33/40

On the Interaction Between Symmetric Tetraalkyldisiloxanes With Dialkyl-dialkenylsilanes and Symmetric Tetraalkyl-dialkenyldisiloxanes

siloxane groupings. Polymeric disiloxanes and polymeric tetra-siloxanes were obtained. The alternating bonds Si-C and Si-O are in the basic chain. The new polymers are thick liquids and have a molecular weight of 800-900 and a viscosity curve that is slightly sloped in dependence on temperature. The carrying out of polymer synthesis is described in the experimental part. The reactions are represented by the equations (2) and (3). There are 1 table and 7 references, 5 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: October 28, 1958

Card 2/2

5(3)

AUTHORS:

Petrov, A.D., Vdovin, V. M.

SOV/62-59-6-35/36

TITLE:

The Synthesis of Polymers With Alternating Siloxane- and Hydrocarbon Links (Sintez polimerov s chereduyushchimisya siloksanovymi i uglevodorodnymi zven'yami)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 6, pp 1139 - 1142 (USSR)

ABSTRACT:

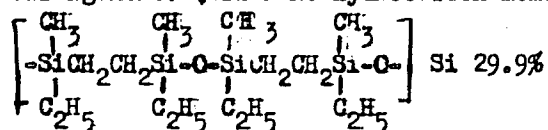
In their investigations the authors found a simple way of synthesizing hydride-organosilicon polymers. These substances were either highmolecular liquids or solid rubber-like substances. The method is based upon the hydrolysis of dichlorosilane in which hydrocarbon-, silicon hydrocarbon-, or siloxane-hydrocarbon chains in desired arrangement between silicon atoms at the end of the chain occur. The equations for the production of dichlorosilane are given. The reactions took place in isopropylalcohol in the presence of the catalyst  $H_2PtCl_6$ . The properties of the dichlorosilanes synthesized are shown in a table. In the experimental part the synthesis itself is described in detail. By means of the hydrolysis of the dichlorosilane with an inner siloxane hydrocarbon chain a glycerin-like grease was obtained. It has a molecular weight of

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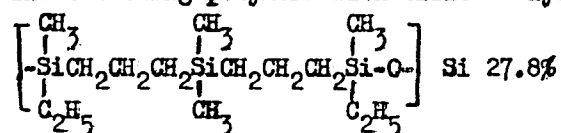
The Synthesis of Polymers With Alternating Siloxane- and Hydrocarbon Links

SOV/62-59-6-35/36

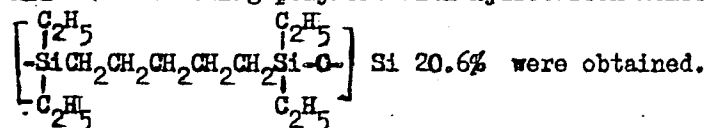
3550 and a viscosity whose temperature dependence curve is represented by a figure. It has chain members of the following arrangement: (siloxane hydrocarbon members)



The following polymers with silicon hydrocarbon members



and the following polymers with hydrocarbon members:



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There are 1 figure, 1 table, and 5 references, 4 of which are Soviet.

The Synthesis of Polymers With Alternating Siloxane- and  
Hydrocarbon Links

SOV/62-59-6-35/36

**ASSOCIATION:** Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk  
SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of  
the Academy of Sciences, USSR)

**SUBMITTED:** December 29, 1958

Card 3/3

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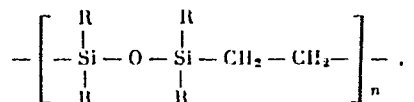
SOV/62-59-12-41/43

AUTHORS: Polyakova, A. M., Suchkova, M. D., Vdovin, V. M.,  
Mironov, V. F., Korshak, V. V., Petrov, A. D.

TITLE: Concerning the Interaction of Acetylene With Siloxanes  
and Silanes. Brief Communications

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh  
nauk, 1959, Nr 12, pp 2257-2259 (USSR)

ABSTRACT: Purified acetylene in reaction with disiloxanes  
 $\text{HR}_2\text{SiOSiR}_2\text{H}$  (where  $\text{R} = \text{CH}_3$  and  $\text{C}_2\text{H}_5$ ) under atmospheric  
pressure, in presence of chloroplatinic acid in iso-  
propanol or platinum on carbon, gave polymers in the  
form of thick oils. IR spectra and other analytical  
data indicate that the macromolecules of these poly-  
mers consist of units:



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Concerning the Interaction of Acetylene  
With Siloxanes and Silanes. Brief  
Communications

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where  $n = 2$  to  $14$ . Physical and chemical constants of polymers obtained in 30.0 to 87.4% yield from tetramethyl-, dimethyldiethyl-, and tetraethyldisiloxanes are tabulated. In similar reactions, purified acetylene with methylphenylchlorosilane  $(CH_3)C_6H_5SiClH$  under atmospheric pressure, in the presence of chloroplatinic acid in isopropanol, gave 1,2-bis-(phenylmethylchlorosilyl)ethane  $Cl(CH_3)(C_6H_5)SiCH_2CH_2Si(C_6H_5)(CH_3)Cl$  in 88% yield. Reaction of acetylene with methyldichlorosilane  $CH_3SiCl_2H$  gave similarly 1,2-bis-(methyldichlorosilyl)ethane  $Cl_2(CH_3)SiCH_2CH_2Si(CH_3)Cl_2$  in 9% yield; the balance consisted in the unreacted starting silane. Acetylene must be completely free of any impurities which could poison the catalyst. IR spectra were taken by N. A. Chumayevskiy. There is 1 table; and 7 references, 2 U.S., 1 Japanese, 4 Soviet. The U.S. references are: J. W. Curry, J. Amer.

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Concerning the Interaction of Acetylene  
With Siloxanes and Silanes. Brief  
Communications

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SOV/62-59-12-41/43

Chem. Soc., 78, 1636 (1956); J. L. Speier, D. B. Hook,  
U.S. Pat. 2823218, 11-02-58.

ASSOCIATION: Institute of Elemento-Organic Compounds, Academy of  
Sciences, USSR, and N. D. Zelinskiy Institute of  
Organic Chemistry, Academy of Sciences, USSR (Institut  
elementoorganicheskikh soyedineniy Akademii nauk SSSR  
i Institut organicheskoy khimii imeni N. D. Zelinskogo  
Akademii nauk SSSR)

SUBMITTED: May 25, 1959

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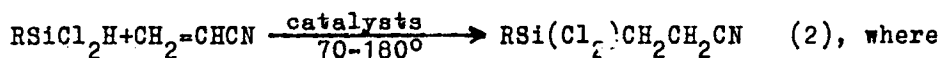
SOV/79-29-9-21/76

AUTHORS: Petrov, A. D., Vdobin, V. M.

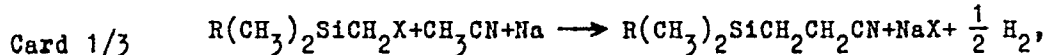
TITLE: Synthesis and Reactions of  $\beta$ -Cyanoethyl Silanes

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 9, pp 2910-2914 (USSR)

ABSTRACT: Russian and foreign chemists synthesized  $\beta$ -cyanoethyl silanes (Refs 2-8) according to the reaction



$\text{R}=\text{Cl}, \text{CH}_3, \text{C}_2\text{H}_5$ . It was found in this connection that  $\beta$ -cyanoethyl silanes, unlike  $\alpha$ -cyanoalkyl silanes (Refs 3, 9-11), react with the cyano group, and therefore may serve as initial products for the synthesis of various carbofunctional organo-silicon compounds. A new method of synthesizing  $\beta$ -cyanoethyl silanes, namely the  $\beta$ -cyanoethyl trialkyl silanes, is described in the present paper. It is based on the well-known reaction by R. H. Wagner and Zook (Ref 12) (Scheme 3 and 4).  $\beta$ -cyanoethyl trialkyl silanes were obtained by the authors according to the scheme



SO"/79-29-9-21/76

Synthesis and Reactions of  $\beta$ -Cyanoethyl Silanes

where  $R=CH_3, C_2H_5$ ;  $X=Cl$  or  $J$  (5). In the case of chloro methyl trialkyl silanes,  $NaJ$  was used as a catalyst. The authors did not succeed in separating the dialkylation products of acetonitrile (Reaction 4). The highest yield of silicon-containing nitrile (52%) was obtained by using iodomethyl trimethyl silane. The structure of  $\beta$ -cyanoethyl trimethyl silane resulting after reaction (5), was proven by reaction (6) and (7). Ketone  $(CH_3)_3SiCH_2CH_2COCH_3$ , which the authors obtained by reaction (6), has been also synthesized, as is known, by other methods (Refs 2, 14), like, for example,  $\beta$ -cyanoethyl trimethyl silane.  $(CH_3)_3SiCH_2CN$  obtained by M. Prober (Ref 10) by reaction of trimethyl chlorosilane with acetonitrile and sodium, could be obtained in a yield of 2% only, because the reaction took place according to another scheme, and yielded  $(CH_3)_3SiNC$  and  $(CH_3)_3Si-N=C-CHSi(CH_3)_3$ , along with other products. With  $\beta$ -trichloro silyl propionitrile, synthesized also by A. D. Petrov according to scheme (1), it is possible, as shown by reactions (8-10), to obtain also  $\beta$ -cyanoethyl silanes with functional groups on the silicon. There are

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SOV/79-29-9-21/76

Synthesis and Reactions of  $\beta$ -Cyanoethyl Silanes

20 references, 10 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk SSSR  
(Institute of Organic Chemistry of the Academy of Sciences,  
USSR)

SUBMITTED: July 28, 1958

Card 3/3

5-~~(2,3)~~ 5.3700 (B) (C)

66425

AUTHORS: Petrov, A. D., Corresponding Member  
AS USSR, Vdovin, V. M., Sultanov, R.

SOV/20-128-6-30/63

TITLE: Synthesis of  $\alpha,\omega$ -Di-(cyano-alkyl) Tetraalkyl Disiloxanes

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 6, pp 1204 - 1207  
(USSR)

ABSTRACT: On the basis of analogy with organic dinitriles, it is to be expected that also organo-silicon compounds having 2 fragments [A] in the molecule ( $A \equiv Si(CH_2)_nCN$ , where  $n \geq 2$ ) may be used as initial raw materials for the production of  $\alpha,\omega$ -difunctional compounds utilizable for the synthesis of organo-silicon polymers. The present paper refers to the synthesis of  $\alpha,\omega$ -dinitriles of type [B] (see Diagram). The addition of 2 moles of allyl cyanide to  $HR_2SiOSiR_2H$  by means of I. L. Speir's (Ref 7) catalyst (Table 1, Experiments Nr 5 and 6) was not successful. Ethyl-methyl chlorosilane has already been added to cyanous olefines (Table 1, Experiments 3,7). The synthesis of the desired  $\alpha,\omega$ -dinitriles was possible by hydrolysis of the monochlorides obtained. Water was used as a hydrolyzing agent. By use of concentrated HCl and under harder conditions, the corresponding  $\alpha,\omega$ -acid was formed.

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Synthesis of  $\alpha,\omega$ -Di-(cyano-alkyl) Tetraalkyl Disiloxanes SOV/20-128-6-30/63

Besides, the authors used the available  $\gamma$ -cyano-propyl-alkyl dichlorosilanes for the said purpose (Table 2, Experiments 1 and 2). Here, the circumstance was made use of that the compound  $-\text{SiCl}_2$ , with respect to Grignard's reagent, is more reactive than  $-\text{C}\equiv\text{N}$  (Refs 1,2) (Diagram). On the basis of a similar reaction,  $(\text{NCCH}_2\text{CH}_2\text{Si}(\text{C}_2\text{H}_5)_2)_2\text{O}$  was also obtained from  $\text{Cl}_3\text{SiCH}_2\text{CH}_2\text{CN}$  and ethyl-magnesium chloride. The former initial substance can be easily produced at present (see Diagram, as well as Patent Ref 5, further Ref 6). The authors carried out the addition of cyanous olefines to hydrosilanes by boiling the reaction mixture in a glass flask with recoler according to reference 7 in the presence of 0.1 n-solution of  $\text{H}_2\text{PtCl}_6$  in isopropyl alcohol.

Table 1 shows the results, table 2 the properties of the nitriles and dinitriles obtained. There are 2 tables and 9 references, 4 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: June 27, 1959  
Card 2/2

Udovini V. sp.

5.3832

**AUTHORS:**  
 PETROV, A. D., Corresponding Member, AS USSR, Frzeclin,  
 L. Kh., Kudryavtsev, G. I., Sledova, T. A., Vdovina, V. M.,  
 Sheyn, P. I.

**TITLE:** Catalytic Hydrogenation of Silicon-containing Acetals and the Fiber-forming Properties of Polyamides Obtained From the Amino Produced Thereby

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 5, PP 1064 - 1067 (USSR)

**ABSTRACT:** The hydrogenation mentioned in the title has been hitherto little investigated (Refs. 1,2). By the investigation under review, the authors succeeded in producing a new series of polymers not described in publications. Polyamides (with alicyclic amino groups) obtained on the basis of dicarboxylic acids and diamine oligo series are known to exhibit caoutchouc-like properties in a number of cases (Ref. 3). The condensation of aromatic dicarboxylic acids (with alicyclic amino groups) with diamine oligo series yields fiber-forming polyamides (Ref. 4). In both cases the alicyclic group in the dicarboxylic acids affects the setting temperature of the polyamides obtained.

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5/5 P2383

**ASSOCIATION:** Institut organicheskoy khimii im. M. D. Zeldinskogo Akademicheskaya shkola 3338 (Institute of Organic Chemistry, Acad. M. D. Zeldinskaya shkola) of the Academy of Sciences, USSR, Vsesoyuznyy nauchnoissledovatel'skiy institut khimicheskogo volokna (All-Union Scientific Research Institute of Synthetic Fibers)

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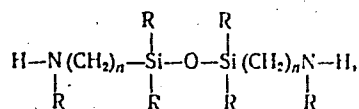
SOV/62-60-1-33/37

AUTHORS: Petrov, A. D., Vdovin, V. M., Pushchevaya, K. S.

TITLE: Brief Communications. Concerning Reaction of  $\alpha, \omega$ -Di(chloroalkyl)tetraalkyldisiloxanes With Ethylamine

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, Nr 1, pp 143-145 (USSR)

ABSTRACT: In order to obtain organosilicon diamines of the type:

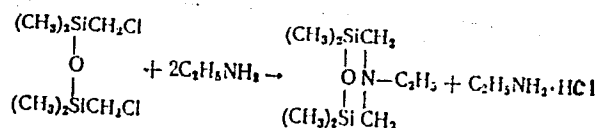


where  $n = 1, 3$ , the reaction of ethylamine with sym-di-(chloromethyl)tetramethyldisiloxane and sym-di( $\gamma$ -chloropropyl)tetraalkyldisiloxane was studied. The sym-di(chloromethyl)tetramethyldisiloxane reacts with ethylamine at room temperature; however, the reaction proceeds in an unexpected direction (see scheme) with

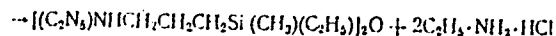
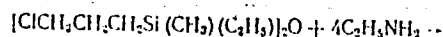
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Brief Communications. Concerning Reaction of 78087  
 $\alpha, \omega$ -Di(chloroalkyl)tetraalkyldisiloxanes With SOV/62-60-1-33/37  
 Ethylamine

the formation of cyclic monoamine in about 90% yield.



The sym-di( $\gamma$ -chloropropyl)tetraalkyldisiloxane does not react with ethylamine at room temperature even on standing for 10 days; but it reacts with ethylamine at 100° in autoclaves, according to the usual scheme for this type of reaction:



The compounds obtained and their properties are shown in Table 1. There are 1 table; and 7 references, 2 U.S., 5 Soviet. The 2 U.S. references are: P. D. George, I. R. Elliott, J. Amer. Chem. Soc., 77, 3493 (1955); J. E.

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Brief Communication: Concerning Reaction of  
 $\alpha, \omega$ -Di(chloroalkyl)tetraalkyldisiloxanes With  
 Ethylamine

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SOV/L2-00-1-33/37

Table 1. Properties of Compounds Obtained. (a) Compound  
 Nr; (b) formula; (c) yield (%); (d) bp in  $^{\circ}\text{C}$  (p in  
 mm of Hg); (e) Found MR; (f) MR, calculated; (g)  
 elemental analysis in %; (h) Found; (i) calculated;  
 (\*) for literature data see: A. D. Petrov, V. A.  
 Ponomarenko, and others, Izv. AN SSSR. Otd. khim. n.  
 1206 (1957); (\*\*) based on chloride taken.

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Table 1.

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SOV/62-60-1-33/37

A	B	C	D	$\frac{n_D^{20}}{d_4^{20}}$	E	F	G	H	I
I*	[ClCH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> ]Si(CH <sub>3</sub> )(C <sub>2</sub> H <sub>5</sub> )Cl	35	101—103(34)	1,4553	0,8815				
II*	[ClCH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> ]Si(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> Cl	44	91—93(10)	1,4600	1,0400				
III	[(ClCH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> )Si(CH <sub>3</sub> )(C <sub>2</sub> H <sub>5</sub> )] <sub>2</sub> O	70	125(3)	1,4577	0,9950	86,4	86,3	Cl 35,6; 35,8	Cl 35,6
IV	[(ClCH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> )Si(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> ] <sub>2</sub> O	61	165—168(2)	1,4654	1,0062	94,7	95,2	Si 18,1	Si 17,8
V	[H(C <sub>2</sub> H <sub>5</sub> )NCH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> Si(CH <sub>3</sub> )(C <sub>2</sub> H <sub>5</sub> )] <sub>2</sub> O	69**	152(2)	1,4511	0,8745	102,5	102,5	Si 17,0; 16,6 C 48,9; 48,7 H 9,2	Si 16,4 C 48,9 H 9,4
VI	(CH <sub>3</sub> ) <sub>2</sub> -Si-CH O N-C <sub>2</sub> H <sub>5</sub> (CH <sub>3</sub> ) <sub>2</sub> -Si-CH <sub>2</sub>	91,5**	61(17)	1,4320	0,8768	60,1	59,9	Si 16,1; 16,5 C 58,2; 58,1 H 12,5; 12,1 N 8,8; 8,7	Si 16,8 C 57,8 H 12,1 N 8,4
VII	[H(C <sub>2</sub> H <sub>5</sub> )NCH <sub>2</sub> CH <sub>2</sub> Si(CH <sub>3</sub> ) <sub>2</sub> ] <sub>2</sub> O	58**	123—126(2)	1,4440	0,8658	93,4	93,5	C 46,5; 46,3 H 10,4; 10,5 N 7,7; 8,0	C 47,2 H 10,4 N 7,5
VIII	[HCH <sub>2</sub> NCH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> Si(CH <sub>3</sub> ) <sub>2</sub> ] <sub>2</sub> O	53**	112—114(2)	1,4433	0,8733	84,0	84,2	N 9,2; 9,2	N 9,1
								N 9,9; 10,0	N 11,1

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Brief Communications. Concerning Reaction of 78087  
 $\alpha, \omega$ -Di(chloroalkyl)tetraalkyldisiloxanes With SOV/62-60-1-33/37  
Ethylamine

Noll, I. L. Speir, B. F. daubert, J. Amer. Chem. Soc.,  
73, 3867 (1951).

ASSOCIATION: N. D. Zelinskiy Institute of Organic Chemistry,  
Academy of Science USSR (Institut organicheskoy  
khimii imeni N. D. Zelinskogo Akademii nauk SSSR)

SUBMITTED: June 27, 1959

Card 5/5

VDOVIN, V. M.

5.3700C also 2109, 2209

83477  
S/190/60/002/009/008/019  
B004/B060

AUTHORS: Polyakova, A. M., Korshak, V. V., Suchkova, M. D.,  
Vdovin, V. M., Chumayevskiy, N. A.

TITLE: Production and Structure Investigation of Polymers Contain-  
ing Siloxane- and Hydrocarbon Links in the Principal Chain  
of Macromolecules. IV.

PERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 9,  
pp. 1360-1369

TEXT: The authors had previously studied (Refs. 1-3) the reaction of acetylene with dihydro tetraalkyl disiloxanes, and determined the structure of the polymers obtained on the strength of their infrared spectrum. In the present article, the authors report on the reaction of acetylene with dihydro siloxanes of varying molar ratios of the reagents. The reaction yields chain-like polymers with different terminal groups. The infrared spectra were examined for the absorption bands of the stretching vibrations of the -Si-H terminal group ( $2100-2150\text{ cm}^{-1}$ ), of the C=C bond (vinyl group  $1595-1600\text{ cm}^{-1}$ , allyl group  $1625-1635\text{ cm}^{-1}$ ), and the

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83477

Production and Structure Investigation of S/190/60/002/009/008/019  
Polymers Containing Siloxane- and Hydrocarbon B004/B060  
Links in the Principal Chain of Macromolecules. IV

asymmetric stretching vibrations of the  $\text{-CH}_2$  terminal group ( $3050\text{ cm}^{-1}$ ).

The spectra shown in Fig. 1 reveal that the reaction of acetylene with excess dihydro siloxane yields a polymerization product (I) having

$\text{-Si-H}$  terminal groups. In the case of an acetylene excess, however, polymer (II) forms with  $\text{-CH=CH}_2$  as terminal groups. This could also be proven chemically. The oily polymerizate (II) was heated to  $130^\circ\text{C}$  at 6000 atm and at atmospheric pressure with tert-butyl peroxide. The product obtained was insoluble in all solvents. If (II) is caused to react with tetraalkyl dihydro disiloxane in the presence of  $\text{H}_2\text{PtCl}_6 \cdot 6\text{H}_2\text{O}$ , the chain is prolonged, and the resulting new polymerizate has  $\text{-Si-H}$  terminal groups. Similar reactions were carried out with acetylene and the polymers (III) described in Ref. 2 (with  $\text{-Si-H}$  as terminal group), and (IV) (with  $\text{-CH=CH}_2$  as terminal group). The reaction of (III) with acetylene yielded a polymerization product with  $\text{-CH=CH}_2$  as terminal group; the reaction of (IV) with tetraethyl dihydro disiloxane yielded a polymerizate with  $\text{-Si-H}$  as terminal

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Production and Structure Investigation of Poly- S/190/60/002/009/008/019  
mers Containing Siloxane- and Hydrocarbon Links B004/B060  
in the Principal Chain of Macromolecules. IV

group (infrared spectra Fig. 2). In both cases, the molecular weight increased, and the chain grew longer. Furthermore, dimethyl diphenyl dihydro disiloxane was caused to react with acetylene. The polymerizate, a viscous mass, had the molecular weight 1670. Table 1 shows the results of the reaction of acetylene with tetramethyl- and dimethyl diethyl dihydro disiloxane at a pressure of 15 atm. The infrared spectra (Fig. 3) of the oily products revealed both the presence of C=C bonds and of =CH<sub>2</sub> as terminal groups. Analyses and molecular weights of the fractions distilled in vacuum are given in Table 2. Only addition products and dimers were obtained on the reaction of phenyl acetylene and diphenyl acetylene with dihydro siloxanes (Table 3). With the exception of the reaction product from diphenyl acetylene and tetraethyl dihydro disiloxane, whose structure is still unclear, the infrared spectra (Fig. 4) revealed -Si-H bands. The infrared spectra were taken with a БНКC М-3 (VIKS М-3) spectrophotometer. The authors thank A. D. Petrov and I. V. Obreimov for interest displayed in the work. There are 4 figures, 3 tables, and 6 references: 4 Soviet, 1 US, and 1 German.

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83477

Production and Structure Investigation of Poly- S/190/60/002/009/008/019  
mers Containing Siloxane- and Hydrocarbon Links B004/B060  
in the Principal Chain of Macromolecules. IV .

ASSOCIATION: Institut elementoorganicheskikh soedineniy AN SSSR  
(Institute of Elemental-organic Compounds of the AS USSR).  
Institut organicheskoy khimii im. N. D. Zelinskogo AN SSSR  
(Institute of Organic Chemistry imeni N. D. Zelinskiy  
of the AS USSR)

SUBMITTED: April 4, 1960

X

Card 4/4

5.3700B

805 9  
S/062/60/000/03/07/007  
B008/B006

AUTHORS: Petrov, A. D., Vdovin, V. M.

TITLE: On Catalytic Disproportionation of Alkyl (Alkenyl)  
Dichloro Silanes

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh  
nauk, 1960, No. 3, pp. 519-526

TEXT: The disproportionation of alkyl (and alkenyl) dichloro silanes using pyridine or Adipodinitrile as catalysts was investigated. The reaction, which always proceeds according to Scheme (1)  
 $2 \text{RSiCl}_2\text{H} \longrightarrow \text{RSiClH}_2 + \text{RSiCl}_3$ , can be used for preparing alkyl (alkenyl) monochloro silanes. Yields of  $\text{RSiClH}_2$  compounds obtained in the presence of the above-mentioned catalysts and from varying amounts of  $\text{RSiCl}_2\text{H}$  are shown in Table 1 and Figs. 1-6. The properties of the alkyl (alkenyl) chloro silanes synthesized for the first time are listed in Table 2. Pyridine, which has not been described as a catalyst for disproportionation in publications, resembles Adipodinitrile in its

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On Catalytic Disproportionation of Alkyl  
(Alkenyl) Dichloro Silanes

S/062/60/000/03/07/007  
B008/B006

catalytic activity with respect to allyl dichlorosilanes, and was even more efficient than the latter catalyst in the disproportionation of ethyl dichloro silane. To increase the reaction rate larger amounts of catalysts are required. Contrary to all other tests, experiments with  $\text{CH}_2=\text{CHCH}_2\text{SiCl}_2\text{H}$  gave slightly lower yields of allyl trichloro silane than allyl chloro silane. Yields of  $\text{RSiClH}_2$  and  $\text{RSiCl}_3$  amounted to 70 - 99% of the initial  $\text{RSiCl}_2\text{H}$ . Different results were only obtained in the experiments No. 1, 11, and 7. In studying the reaction (1), it was found that the structure of the organic radical in  $\text{RSiCl}_2\text{H}$  has a marked effect on the reaction rate. It can be seen in Table 1 that as the radical becomes smaller down to the ethyl radical, the reaction rate decreases and finally, in the case of  $\text{R} = \text{CH}_3$ , the reaction does not occur at all. The dependence of the reaction rate on the type of radical bonded with silicon is specially pronounced in the case of alkenyl radicals with a short bond in the  $\gamma$  position with respect to silicon. The authors thank L. A. Leytes for taking and analyzing the spectra. The following persons are mentioned: B. N. Dolgov, M. G. Voronkov, S. N. Borisov, V. F. Mironov, and G. I. Nikishin. There are

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On Catalytic Disproportionation of Alkyl  
(Alkenyl) Dichloro Silanes

80609  
S/062/60/000/03/07/007  
B008/B006

6 figures, 2 tables, and 19 references, 12 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii  
nauk SSSR (Institute of Organic Chemistry imeni N. D.  
Zelinskiy of the Academy of Sciences USSR) ✓

SUBMITTED: July 28, 1958, supplemented on July 4, 1959

Card 3/3

84860

S/062/60/000/010/014/018  
B015/B064

53700 2209, 1273, 1274

AUTHORS: Freydlin, L. Kh., Petrov, A. D., Sladkova, T. A., and  
Vdovin, V. M.

TITLE: Catalytic Hydrogenation of Silicon Containing  $\beta$ - and  
 $\gamma$ -Nitriles

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh  
nauk, 1960, No. 10, pp. 1878 - 1881

TEXT: A hydrogenation of the  $\beta$ -cyanoethyl- and  $\gamma$ -cyanopropyl silanes  
to the corresponding primary amines was carried out on metal catalysts.  
The hydrogenation was made in a rotating steel autoclave (volume 0.175 l)  
by a method already described. The effect of the composition of the  
catalyst, the reaction conditions, and the molecular structure of the  
cyanoalkyl silanes upon the amine yield was investigated. First, the  
hydrogenation of cyanoalkyl silanes without alkoxyl groups was studied,  
and then with two or three alkoxyl groups on the silicon atom (Table 1,  
experimental conditions and results). Just as in the hydrogenation of

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Catalytic Hydrogenation of Silicon  
Containing  $\beta$ - and  $\gamma$ -Nitriles

84860  
S/062/60/000/010/014/018  
B015/B064

aliphatic nitriles containing no silicon atoms, hydrogenation of silicon containing nitriles on cobalt skeleton catalysts was found to be most selective. Hydrogenation of  $\beta$ -cyanoethyl trialkoxy silanes can be carried out only in the presence of ammonia. In the presence of ammonia, primary amines are preferably formed. The properties of the silicon containing primary amines thus produced are given in Table 2. There are 2 tables and 8 references: 4 Soviet, 1 German, 2 US, and 1 Japanese. X

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo  
Akademii nauk SSSR (Institute of Organic Chemistry  
imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: March 9, 1960

Card 2/2

5.3600

78267  
SOV/79-30-3-21/69

AUTHORS: Vdovin, V. M., Petrov, A. D.

TITLE: Synthesis and Properties of  $\alpha, \omega$ -Polychlorodisilyl-alkanes

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol 30, Nr 3,  
pp 838-845 (USSR)

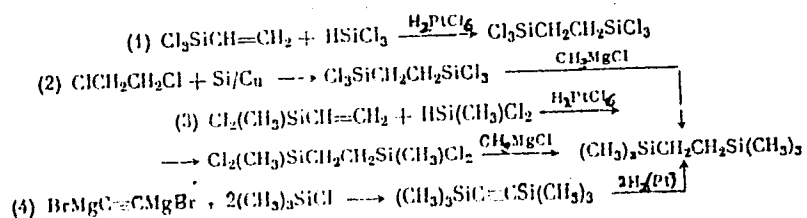
ABSTRACT: The work at hand was devoted to the study of the order of addition of silanes to vinyl- and allyl-containing organosilicon compounds in the presence of  $H_2PtCl_6$ , and to the use of this simple method for synthesis of known  $\alpha, \omega$ -polychlorodisilanes, previously prepared by other methods, as well as of new compounds of  $\alpha, \omega$ -polychlorodisilanes with di-, tri-, and hexamethylene, organosilicon, and hydrocarbon-siloxane bridges. The order of addition of chloro (or chloroalkyl) silyl group to vinyl-containing organosilicon compounds is shown by the following scheme, where one can assume that the

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Synthesis and Properties of  $\alpha$ ,  
 $\omega$ -Polychlorodisilylalkanes

78267  
 SOV/79-30-3-21/69

addition of silyl group, in the presence of  $H_2PtCl_6$ ,  
 occurs contrary to Markownikoff's rule, in the manner  
 of schemes 5-9.

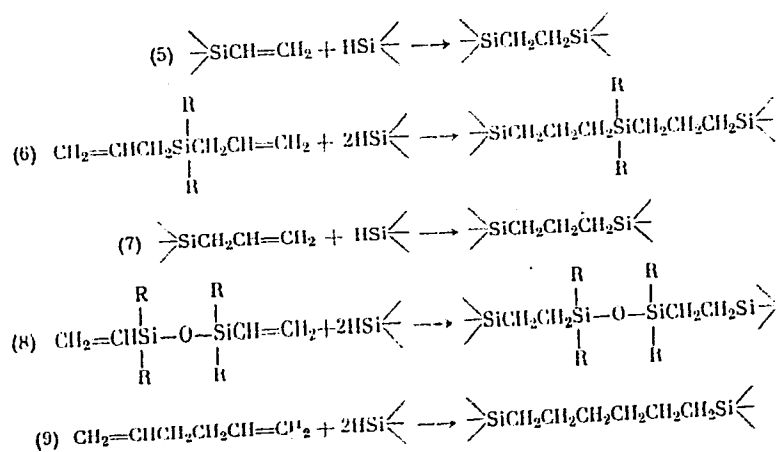


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Scheme 1-4

Synthesis and Properties of  $\alpha, \omega$ -Polychlorodisilylalkanes

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SOV/79-30-3-21/69



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Scheme 5-9

Synthesis and Properties of  $\alpha$ ,  
 $\omega$ -Polychlorodisilylalkanes

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SOV/79-30-3-21/69

The properties of the prepared compounds are shown  
in Table 2.

Table 2. Key: (A) Properties of  $\alpha$ , $\omega$ -polychloro-  
disilanes and their derivatives; (B) Nr; (C) Adducts  
and their derivatives; (D) Bp (pressure in mm);  
(E) Found; (F) Calculated; (G) Empirical Formula;  
(\*) Prepared for the first time.

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Synthesis and Properties of  $\alpha$ ,  
 $\omega$ -Polychlorodisilyalkanes

A Table 2

78267  
30V/79-30-3-21/62

B	C	D	$d_4^{20}$	$n_D^{20}$	MR <sub>D</sub>		G
					E	F	
1	$\text{Cl}_2\text{SiCH}_2\text{CH}_2\text{SiCl}_3$	200-205 (757) mp 17.2°	—	—	—	—	$\text{C}_2\text{H}_5\text{Si}_2\text{Cl}_6$
2	$\text{Cl}_3\text{SiCH}_2\text{CH}_2\text{Si}(\text{C}_2\text{H}_5)\text{Cl}_2$	118-119 (45) mp 11	1.3714	1.5310	76.1	76.4	$\text{C}_2\text{H}_5\text{Si}_2\text{Cl}_5$
3	$\text{Cl}_2(\text{C}_2\text{H}_5)\text{SiCH}_2\text{CH}_2\text{Si}(\text{C}_2\text{H}_5)\text{Cl}_2$	109-111 (39) mp 32.5	—	—	—	—	$\text{C}_4\text{H}_{10}\text{Si}_2\text{Cl}_4$
4	$\text{Cl}_2(\text{C}_2\text{H}_5)\text{SiCH}_2\text{CH}_2\text{Si}(\text{C}_2\text{H}_5)\text{Cl}_2^*$	231-232 (753)	1.2733	1.4170	61.7	61.5	$\text{C}_4\text{H}_{12}\text{Si}_2\text{Cl}_4$
5	$(\text{C}_2\text{H}_5)_2(\text{C}_2\text{H}_5)\text{SiCH}_2\text{CH}_2\text{Si}(\text{C}_2\text{H}_5)(\text{C}_2\text{H}_5)_2^*$	10 (11)	0.8038	1.4475	76.5	76.5	$\text{C}_{12}\text{H}_{26}\text{Si}_2$
6	$(\text{CH}_3)_3\text{SiCH}_2\text{CH}_2\text{Si}(\text{CH}_3)_3$	150.5-151.5 (702)	0.7522	1.4195	—	—	$\text{C}_8\text{H}_{18}\text{Si}_2$
7	$(\text{CH}_3\text{COO})_2(\text{C}_2\text{H}_5)\text{SiCH}_2\text{CH}_2\text{Si}(\text{C}_2\text{H}_5)(\text{OOCCH}_3)_2^*$	167-169(2) mp 34.5	—	—	—	—	$\text{C}_{13}\text{H}_{24}\text{O}_4\text{Si}_2$
8	$(\text{C}_2\text{H}_5)_2(\text{C}_2\text{H}_5)\text{SiCH}_2\text{CH}_2\text{Si}(\text{OC}_2\text{H}_5)_2(\text{C}_2\text{H}_5)$	79-80 (15)	0.9300	1.4180	79.9	80.0	$\text{C}_{12}\text{H}_{26}\text{O}_4\text{Si}_2$

(table cont'd)

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Synthesis and Properties of  $\omega$ -Polychlorodisilylalkanes

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B	C	D	$d_4^{20}$	$n_D^{20}$	MR <sub>D</sub>		G
					E	F	
9	$[\text{Cl}(\text{CH}_3)\text{SiCH}_2\text{CH}_2\text{Si}(\text{CH}_3)(\text{C}_2\text{H}_5)-]_n$	137-138 <sup>2</sup> (3)	1.0850	1.4650	113.2	112.8	$\text{C}_{12}\text{H}_{20}\text{OSi}_2\text{Cl}_4$
10	$\text{Cl}_3\text{SiCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{CH}_3)\text{CH}_2$	110-110.5 (18)	1.3223	1.4711	61.3	61.2	$\text{C}_4\text{H}_9\text{Si}_2\text{Cl}_2$
11	$(\text{CH}_3)_3\text{SiCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{CH}_3)\text{Cl}_2$	199-200 (742)	0.9653	1.4430	—	—	$\text{C}_7\text{H}_{18}\text{Si}_2\text{Cl}_2$
12	$(\text{CH}_3)_3\text{SiCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{CH}_3)_3$	171.7 (747)	0.7561	1.4220	—	—	$\text{C}_{10}\text{H}_{22}\text{Si}_2$
13	$[\text{Cl}(\text{CH}_3)\text{SiCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{C}_2\text{H}_5)_2]_n$	148-149 (2)	1.0830	1.4760	103.7	103.4	$\text{C}_{12}\text{H}_{25}\text{Si}_2\text{Cl}_4$
14	$(\text{C}_2\text{H}_5\text{SiCH}_2\text{CH}_2\text{CH}_2)_n$	131-132 (4)	1.3308	1.4760	74.8	74.7	$\text{C}_6\text{H}_{12}\text{Si}_2\text{Cl}_4$
15	$[\text{Cl}(\text{CH}_3)\text{SiCH}_2\text{CH}_2\text{CH}_2\text{H}_2]_n$	119-121 (3)	1.1310	1.4660	76.4	75.4	$\text{C}_8\text{H}_{14}\text{Si}_2\text{Cl}_4$
16	$[\text{Cl}(\text{C}_2\text{H}_5)\text{SiCH}_2\text{CH}_2\text{CH}_2]_n$	137-139 (2)	1.1273	1.4737	84.7	84.5	$\text{C}_{10}\text{H}_{22}\text{Si}_2\text{Cl}_4$
17	$\text{Cl}(\text{CH}_3)(\text{C}_2\text{H}_5)\text{SiCH}_2\text{CH}_2(\text{CH}_3)(\text{C}_2\text{H}_5)\text{SiOSi}(\text{CH}_3)(\text{C}_2\text{H}_5)(\text{CH}=\text{CH}_2)_2$	101-103 (2)	0.9174	1.4490	94.5	94.4	$\text{C}_{13}\text{H}_{21}\text{Si}_2\text{Cl}$

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Synthesis and Properties of  $\alpha$ ,  
 $\omega$ -Polychlorodisilyalkanes

78267  
SOV/79-30-3-21/69

There are 2 tables; 3 figures; and 13 references, 10 Soviet, 2 U.S., 1 Japanese. The 2 U.S. references are: Burkhard, C. A., Krieble, R. U., J. Am. Chem. Soc., 69, 2687 (1947); Speir, I. L., J. Am. Chem. Soc., 79, 977 (1957).

ASSOCIATION: Institute of Organic Chemistry of the Academy of Sciences of the USSR (Institut organicheskoy khimii Akademii nauk SSSR)

SUBMITTED: March 7, 1959

Card 7/7

89911

15.8116 also 1164

S/062/61/000/002/007/012  
B115/B207

AUTHORS: Vdovin, V. M., Pushchevaya, K. S., and Petrov, A. D.

TITLE: Organosilicon compounds with hydrocarbon bridges between the silicon atoms. Report no. 1. Interaction of 1,2-disilethanes with metal halides

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, no. 2, 1961, 281-286

TEXT: The authors found that the properties of the Si-R-Si group (R = hydrocarbon radical) have hitherto been insufficiently investigated, and therefore devoted this paper to studies of substances containing a

disilethane group  $\text{Si}-\text{CH}_2-\text{CH}_2-\text{Si}\equiv$  with methyl radicals and chlorine

atoms on silicon atoms. They studied the effect of metal halides having the properties of Lewis acids upon the mentioned substances. The metal halides were subdivided into three groups owing to their interaction with 1,2-hexamethyl disilethane: Group I: Halides not reacting with

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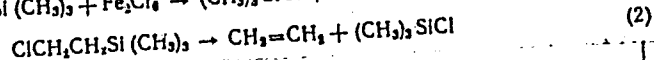
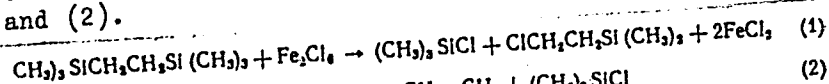
89911

S/062/61/000/002/007/012  
B115/B207

Organosilicon compounds with ...

hexamethyl disilane:  $\text{ZnCl}_2$ ,  $\text{TiCl}_4$ ,  $\text{SnCl}_4$ ,  $\text{BF}_3$  etherate,  $\text{FeCl}_2$ .

Group II:  $\text{FeCl}_3$  reacts with formation of low-molecular compounds: trimethyl chloro silane and, obviously, ethylene. This proves the simultaneous splitting of the Si-C bond and the elimination of the carbon chain (bridge). The decomposition proceeds according to the reaction schemes (1) and (2).



Group III: Aluminum halides causing the formation of  $\text{Si}(\text{CH}_3)_4$  and silicon-containing polymers. By moderate heating of  $(\text{CH}_3)_3\text{SiCH}_2\text{-CH}_2\text{Si}(\text{CH}_3)_3$  with  $\text{AlX}_3$ , 0.7-0.9 M  $\text{Si}(\text{CH}_3)_4$  is separated. At the same time, a polymer of the following structure:  $[-\text{Si}(\text{CH}_3)_2\text{-CH}_2\text{-CH}_2\text{-}]$  forms in the reaction mixture. Under special conditions (minimum amount of

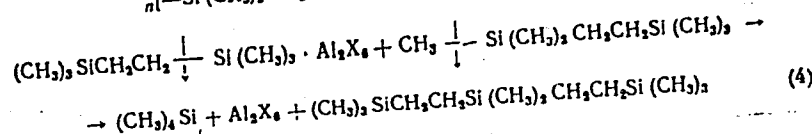
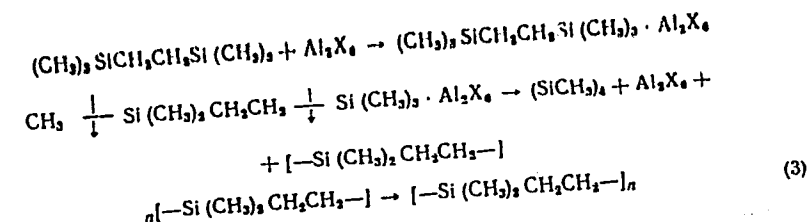
Card 2/7

89911

S/062/61/000/002/007/012  
B115/B207

Organosilicon compounds with ...

catalyst and interruption of the reaction at the moment where the precipitate reached  $\sim 0.3 \text{ M Si(CH}_3)_4$  two compounds were separated from this polymer:  $[-\text{Si(CH}_3)_2\text{CH}_2\text{-CH}_2-]_n$ , where  $n = 2, 3$ . The reaction may be represented by the following schemes: (3) or (4).



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Organosilicon compounds with ...

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The linear dimer forming in accordance with scheme (4), is transformed in a similar manner into linear polymers of the type:  
 $(\text{CH}_3)_3\text{SiCH}_2\text{CH}_2[\text{Si}(\text{CH}_3)_2\text{CH}_2\text{CH}_2]_n\text{Si}(\text{CH}_3)_3$ , or into cyclic polymers of the  $[\text{Si}(\text{CH}_3)_2\text{CH}_2\text{CH}_2]_n$  type. The two processes occur with separation of  $(\text{CH}_3)_4\text{Si}$ . Furthermore, the authors studied the effect of the substituents on the silicon atom of 1,2-disilethanes upon the direction of polycondensation. They found that the conversion of compounds with disilethane groups only proceeds if at least one silicon atom is linked with three  $\text{CH}_3$  radicals. As regards the activity of the interaction with  $\text{AlCl}_3$  and  $\text{AlBr}_3$ , the disilethanes studied form the following series:  $(\text{CH}_3)_3\text{SiCH}_2\text{CH}_2\text{Si}(\text{CH}_3)_3 > (\text{CH}_3)_3\text{SiCH}_2\text{CH}_2\text{Si}(\text{CH}_3)\text{Cl}_2 > (\text{CH}_3)_3\text{SiCH}_2\text{CH}_2\text{SiCl}_3 \gg (\text{CH}_3)\text{Cl}_2\text{SiCH}_2\text{CH}_2\text{SiCl}_2(\text{CH}_3), \text{Cl}_3\text{SiCH}_2\text{CH}_2\text{SiCl}_3$ . With disilethanes having only one  $\text{Si}(\text{CH}_3)_3$  group and one  $\text{Si}(\text{R})\text{Cl}_2$  group, the conversion proceeds according to schemes (6) and (7) which are similar to (3) and (4),

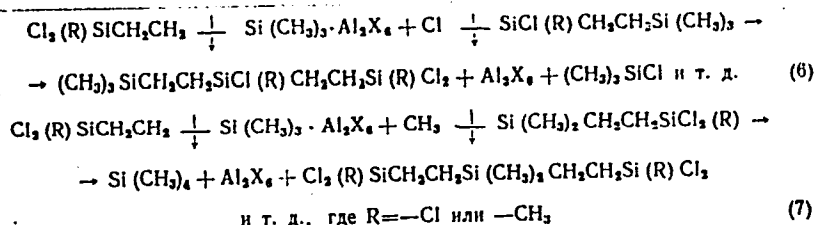
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03911

S/062/61/000/002/007/012  
B115/B207

Organosilicon compounds with ...

respectively.



The fact that in the interaction of  $\text{AlX}_3$  with  $(\text{CH}_3)_3\text{SiCH}_2\text{CH}_2\text{SiCl}_3$  the  $\text{Si}(\text{CH}_3)_4$  is formed proves that the polycondensation found follows, at least partly, scheme (4). This was also confirmed by the experiment in which the authors caused 10 mole%  $\text{AlBr}_3$  to act upon the equimolar mixture of  $(\text{CH}_3)_3\text{SiCH}_2\text{-CH}_2\text{Si}(\text{CH}_3)_3$  and  $\text{Cl}_2(\text{CH}_3)\text{SiCH}_2\text{-CH}_2\text{Si}(\text{CH}_3)\text{Cl}_2$ .  $(\text{CH}_3)_3\text{SiCl}$  was the principal product obtained, which must be due to the

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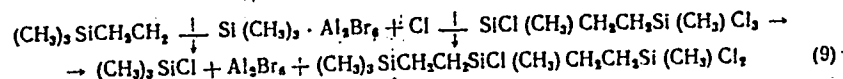


89911

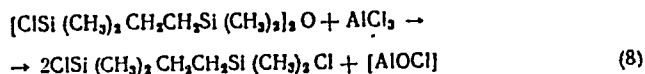
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B115/B207

Organosilicon compounds with ...

following intermolecular reaction (9).



Polycondensation also proceeds under the action of  $\text{AlCl}_3$  upon compounds containing the disilethane group and the  $-\text{Si}-\text{O}-\text{Si}-$  group. Thus, in the reaction (8)



a considerable amount of a mixture of low-boiling methyl-silane chlorides forms simultaneously with the principal product ( $\alpha$ - $\omega$ -dichloride). The polycondensation studied also proceeds in the case of other  $\alpha, \omega$ -hexamethyl disilalkanes:  $(\text{CH}_3)_3\text{Si}(\text{CH}_2)_n\text{Si}(\text{CH}_3)_3$ .

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89911

Organosilicon compounds with ...

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The compounds with  $n = 1, 3, 4, 5$  studied by the authors formed  $\text{Si}(\text{CH}_3)_4$  and a polymeric silicon hydrocarbon consisting of disilalkane fragments also in the reaction with aluminum halides. The authors thank Yu. P. Yegorov and L. A. Leytes for making the spectrum analysis. There are 10 references: 7 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo  
Akademii nauk SSSR (Institute of Organic Chemistry  
imeni N. D. Zelinskiy of the academy of Sciences USSR)

SUBMITTED: September 19, 1959; supplemented June 18, 1960

X

Card 7/7

15.8170

25216

S/062/.61/000/007/006/009  
B117/B215

AUTHORS: Vdovin, V. M., Pushchevaya, K. S., and Petrov, A. D.

TITLE: Organosilicon compounds with hydrocarbon bridges between silicon atoms

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 7, 1961, 1275 - 1279

TEXT: Information 2. Interaction with aluminum halides. The present paper reports on the behavior of 1,3-disilpropane during polycondensation. The disilpropane compounds used were produced by a known method (Ref. 5: V. M. Vdovin i A. D. Petrov, Zh. obshch. khim. 30, 838 (1960)). Their properties are the same as those described in publications (Refs. 5 and 6: A. V. Topchiyev, N. S. Nametkin i S. G. Durgar'yan, Zh. obshch. khim. 30, 927 (1960)). The  $-\text{[Si(CH}_3)_2\text{CH}_2\text{CH}_2\text{CH}_2-]_n$  - polymer was obtained in the form of a colorless, viscous oil with a boiling point  $> 300^\circ\text{C}$  by the method of Ref. 3 (V. V. Korshak, A. M. Polyakova i dr. Izv. AN SSSR, Otd. khim. n., 1959, 1116). Chemically pure  $\text{AlX}_3$  preparations were used. The reaction of 1,3-disilpropane compounds with aluminum halides was

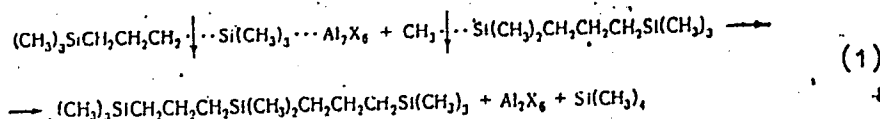
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Organosilicon compounds ...

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S/062/61/000/007/006/009  
B117/B215

conducted in a flask with descending cooler and a vessel for low-boiling products. ( $0 \div -10^\circ\text{C}$ ). Test conditions are tabulated. The reaction follows the scheme



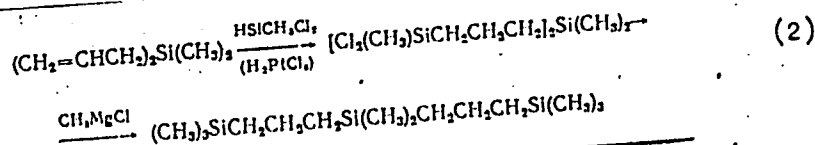
which is similar to scheme (b) of Ref. 1 (V. M. Vdovin, K. S. Pushchevaya, I. A. D. Petrov, Izv. AN SSSR, Otd. khim. n. 1961, 281) for 1,2-disiletham derivatives. On the whole, the dimer yielded linear polymers of the type  $(\text{CH}_3)_3\text{SiCH}_2\text{CH}_2\text{CH}_2[\text{Si}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{CH}_2]_n\text{Si}(\text{CH}_3)_3$  with  $n \neq 1$ . The first two members ( $n = 1$  and  $2$ ) were isolated. Infrared spectra confirmed their structure. The structure of the dimer was additionally confirmed by countersynthesis according to the scheme

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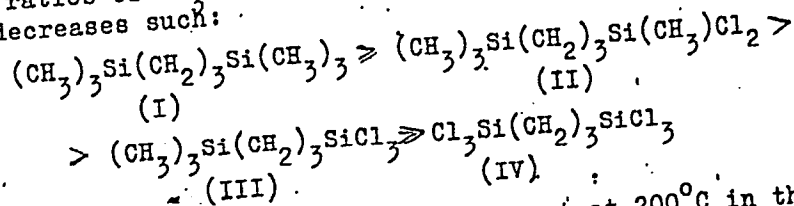
Organosilicon compounds with ...

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The properties of the substances obtained in both cases proved identical. The examination of the activity of 1,3-disilpropane derivatives with different ratios of CH<sub>3</sub>- and Cl groups on the Si atom showed that their activity decreases such:



The last member in the sequence does not react at 200°C in the presence of AlBr<sub>3</sub> used in amounts up to 40 mole%. According to the low-boiling

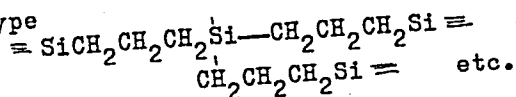
Card 3/6

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B117/B215

Organosilicon compounds with ...

products, the transformation in the case of (II) and (III) is similar to reaction (b) of Ref. 1. The formation of  $\text{Si}(\text{CH}_3)_4$  from trichloride (III) indicates that the reaction follows an intramolecular mechanism. Besides the low-boiling products, a polymer residue forms which contains hydrolyzable chlorine. During reaction (1) at  $90^\circ - 100^\circ \text{C}$ , up to 0.95 M  $\text{Si}(\text{CH}_3)_4$  per mole of  $(\text{CH}_3)_3\text{SiCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{CH}_3)_3$  is separated, and a rubber-like polymer with a structure near  $[-\text{Si}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{CH}_2-]_n(\text{SiC}_5\text{H}_{10})$  is formed. The formation of  $\text{Si}(\text{CH}_3)_4$  sets in again after further effective heating, and especially in the presence of considerable amounts of catalyst. It was assumed that the developing linear disilpropane polymers undergo cross-linking in effective heating which follows a scheme similar to (1), where  $\text{Si} \cdots \text{CH}_2\text{CH}_2\text{CH}_2\text{Si} \equiv$  bonds are ruptured. This reaction is accompanied by a formation of  $\text{Si}(\text{CH}_3)_4$  and a spatial polymer of the type



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This assumption was proven by heating the linear polymer  $-\text{Si}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{CH}_2-$  with  $\text{AlCl}_3$ :  $\text{Si}(\text{CH}_3)_4$  was separated from the reaction mixture, and an unsoluble, cross-linked polymer formed. In 1,3-disilpropane compounds like in 1,2-disilthane derivatives, the temperature of the beginning reaction was lowered by an increase of the molar  $\text{AlX}_3$  percentage.  $\text{AlBr}_3$  proved a more active catalyst than  $\text{AlCl}_3$ . The cleavage of  $\text{Si}-\text{C}$  bonds in disilpropane groups apparently also takes place if the compound contains  $\equiv\text{SiCH}_2\text{CH}_2\text{CH}_2\text{Si}\equiv$  and  $\equiv\text{Si}-\text{O}-\text{Si}\equiv$  groups. There are 1 table and 9 references: 7 Soviet-bloc and 2 non-Soviet-bloc. The two references to English-language publications read as follows: Ref. 2: I. W. Curru et. al.: J. Organ. Chem. 23, No 8, 1219 (1958); Ref. 7: D. Hurd, J. Amer. Chem. Soc. 67, 1813 (1945).

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: August 26, 1960  
Card 5/6

29520  
S/062/61/000/011/007/012  
B103/B147

53700

AUTHORS: Vdovin, V. M., Sultanov, R., Sladkova, T. A., Freydlin, L. Kh.,  
and Petrov, A. D.

TITLE: Addition of alkoxy silane hydrides to unsaturated nitriles  
and hydration of the  $\omega$ -cyano-alkyl-alkoxy silanes produced

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh  
nauk, no. 11, 1961, 2007 - 2012

TEXT: The authors studied the addition of alkoxy silane hydrides to:  
a) allyl cyanide; b)  $\beta$ -cyano-ethyl ether of allyl alcohol; and c)  
acrylonitrile. It has been found that the addition takes place as follows:  
 $R'(RO)_2SiH + CH_2 = CHCH_2X \rightarrow R'(RO)_2SiC_2H_4CH_2X$ ,  $R'$  being  $-CH_3$ ,  $-OC_2H_5$ , or  
 $-OCH_3$ ;  $R$  being  $-CH_3$ , or  $-C_2H_5$ ; and  $X$  being  $-OCH_2CH_2CN$ , or  $-CN$ . The reaction  
takes place already at atmospheric pressure, if a mixture of equimolar  
quantities of the reagents is boiled in the presence of Pt/C (20% of Pt)  
or a 0.1 N solution of  $H_2PtCl_6$  in isopropyl alcohol. The yields in  
addition products were 40 - 50% related to the components used, and up to  
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Addition of alkoxy silane hydrides...


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85% related to reacted unsaturated nitrile. Yields can be increased and the reaction time essentially reduced in sealed glass ampullas. The main reaction was accompanied in all cases by a disproportionation of the alkoxy radicals of the initial alkoxy silane hydrides:  $2(\text{C}_2\text{H}_5\text{O})_3\text{SiH} \rightarrow (\text{C}_2\text{H}_5\text{O})_4\text{Si} + [(\text{C}_2\text{H}_5\text{O})_2\text{SiH}_2]$ , whereby the dihydride formed continued to disproportionate. The frequencies of  $-\text{CH}_3$  groups were absent in the infrared absorption spectra of the  $\omega$ -cyano-alkyl trichlorosilane. For this reason, the structures:  $\text{Cl}_3\text{SiCH}_2\text{CH}_2\text{CH}_2\text{CN}$  and  $\text{Cl}_3\text{SiCH}_2\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CN}$  were attributed to these nitriles. The  $\omega$ -cyano-alkyl-trialkoxo silanes which were produced by addition of both trialkoxy silane hydride and  $\text{HSiCl}_3$  to unsaturated nitriles, had identical properties. Thus, it is concluded that the addition of both  $(\text{RO})_3\text{SiH}$  and  $\text{Cl}_3\text{SiH}$  to these nitriles proceeds in the same way, i. e., that the trialkoxy silyl group is placed at the end of the molecule. The interaction of  $\text{CH}_3(\text{OC}_2\text{H}_5)_2\text{SiH}$  and unsaturated nitriles results perhaps in a mixture of products added to the double bond. This is proved by the wide boiling ranges of these products. An Card 2/ ~~4~~ 4

Addition of alkoxy silane hydrides...

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S/062/61/000/011/007/012  
B103/B147

addition to the triple bond  $-C\equiv N$  which could be possibly expected (in analogy to the data of Ref. 7, R. Calas et al. Compt. rend. 252, 420 (1961)), did not occur. Addition of  $(C_2H_5O)_3SiH$  to acrylonitrile was achieved neither at atmospheric nor at elevated pressure in the presence of catalysts and other substances (in glass ampullas at 150 - 180°C); whereas acrylonitrile was polymerized and triethoxy silane disproportionated, or the initial substances remained unchanged. The  $\omega$ -cyano-alkyl-triethoxy silanes produced were hydrated to the relevant primary amines in the presence of Co or Ni skeleton catalysts under pressure according to the previously described methods (A. D. Petrov et al. Dokl. AN SSSR, 129, 1064 (1959); L. Kh. Freydlin et al. Izv. AN SSSR, Otd. khim. n. 10, 1878 (1960); V. N. Vdovin et al., author's certificate, SSSR 133683; Byull. izobreteniy SSR 23 (1960)) (Table 2). It has been found that the catalyst type and the structure of the nitrile have a remarkable effect on the yield in primary amine. The reaction was more selective in the presence of Co catalysts than of Ni catalysts. The yield in amine was higher on hydration of  $\gamma$ -cyano-alkyl-trialkoxy silane than on reduction of  $\beta$ -cyano-ethyl-triethoxy silane. It has been established that hydration of  $\alpha, \omega$ -(dicyano-alkyl)-tetraethoxy disiloxanes to the relevant

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Addition of alkoxy silane hydrides...

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S/062/61/000/011/007/012  
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primary  $\alpha, \omega$ -diamines is possible (Table 3). The  $\alpha, \omega$ -dinitriles mentioned were formed as by-products of etherification of  $\omega$ -cyano-alkyl-trichloro-silanes. There are 3 tables and 12 references: 5 Soviet and 7 non-Soviet. The three most recent references to English-language publications read as follows: Ref. 3: L. H. Sommer et al. J. Amer. Chem. Soc. 79, 2764 (1957); Ref. 6: V. B. Jex, J. Mc Mahon, US-Patent 2907784; Chem. Abstr. 54, 4388 (1960); Ref. 11: B. V. Aller, J. Appl. Chem., 7, 130 (1957). X

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: June 15, 1961

Table 1. Properties of organosilicon nitriles and dinitriles.  
Legend: (1) boiling point (p, mm Hg); (2) found; (3) calculated.

Table 2. Catalytic hydration of alkyl-cyano silanes in the presence of skeleton catalysts.

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15.8170

27905

S/079/61/031/010/005/010  
D227/D303

AUTHORS: Petrov, A.D., Vdovin, V.M., Golubeva, G., and  
Pushchevaya, K.S.

TITLE: Organosilicon compounds with hydrocarbon bridges  
between silicon atoms. IV. Pyrolysis of  $\alpha, \omega$ -  
disilalkanes

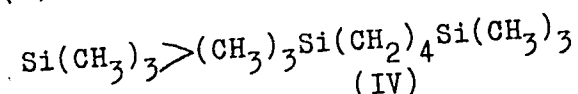
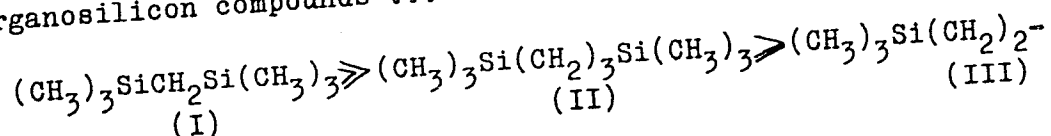
PERIODICAL: Zhurnal obshchey khimii v. 31, no. 10, 1961,  
3230-3234

TEXT: In the present work the authors studied the pyrolysis of  
 $\alpha, \omega$ -disilalkanes of the type  $R_3Si(CH_2)_nSiR_3$  where R is Cl or  
 $CH_3$  and  $n = 1$  to 4, at  $600^\circ C$  in a continuous flow system. The  
thermal stability of these compounds was determined by the quan-  
tity of 1) Gaseous and low boiling products; 2) Heavy residues;  
3) Gases evolved. The decreasing order of stability of the in-  
vestigated  $\alpha, \omega$ -hexamethyldisilalkanes is as follows:

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D227/D303

Organosilicon compounds ...



and the results of pyrolysis are represented in Table 1 where A is the weight % of gaseous and low boiling product and is calculated from  $\frac{M_1 - M_2}{M_1 - 1}$ ,  $M_1$  = weight of the original disilalkane,  $M_2$  = weight of pyrolysis products after distillation of low boiling products, B is the volume of gas (at  $20 \pm 2^\circ\text{C}$ ) in ml. per 0.1 g. mol. of disilalkane at a given flow rate; and C is weight % of high boiling residues. Experimental procedure: The pyrolysis was carried out in a quartz tube heated to  $600 \pm 5^\circ\text{C}$  and the products

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Organosilicon compounds ...

collected in a trap cooled to  $-10$  to  $-15^{\circ}\text{C}$ . Fractionation of products was done using a column with 20 theoretical plates and the fractions obtained were analyzed spectrometrically. Compound I gave gaseous products consisting of 93.9%  $\text{H}_2$  and 6.1%  $\text{CH}_4$ ; compound III yielded 13.5%  $\text{CH}_2 = \text{CHSi}(\text{CH}_3)_3$  b.pt  $54-55^{\circ}\text{C}$ , low boiling products mainly  $(\text{CH}_3)_3\text{SiH}$  and  $(\text{CH}_3)_4\text{Si}$  and gases  $\text{H}_2$ ,  $\text{CH}_4$ ,  $\text{C}_2\text{H}_6$  and  $\text{C}_2\text{H}_4$ . Compound II decomposed into  $(\text{CH}_3)_3\text{SiH}$  and  $\text{Si}(\text{CH}_3)_4$  and also  $(\text{CH}_3)_3\text{SiCH} = \text{CH}_2$ , with  $\text{H}_2$ ,  $\text{CH}_4$ ,  $\text{C}_2\text{H}_6$ ,  $\text{C}_2\text{H}_4$  and  $\text{C}_3\text{H}_6$ . Compound IV gave a fraction, b.pt  $0-53^{\circ}\text{C}$ , containing  $(\text{CH}_3)_3\text{SiCH}_2\text{CH} = \text{CH}_2$  and  $(\text{CH}_3)_3\text{SiCH}_2\text{CH} = \text{CH}_2$ ; also gaseous products as above.  $\text{Cl}_3\text{SiCH}_2\text{CH}_2\text{SiCl}_3$  decomposed into  $\text{HSiCl}_3$ ,  $\text{SiCl}_4$  and a mixture of  $\text{CH}_2 = \text{CHSiCl}_3$  and  $\text{CH}_3\text{CH}_2\text{SiCl}_3$ . Compound  $\text{Cl}_2(\text{CH}_3)\text{SiCH}_2\text{CH}_2\text{Si}(\text{CH}_3)\text{Cl}_2$  yielded beside  $\text{CH}_3\text{SiCl}_2\text{H}$  and  $\text{CH}_3\text{SiCl}_3$  a mixture

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D227/D303

Organosilicon compounds ...

composed of  $\text{CH} = \text{CHSi}(\text{CH}_3)\text{Cl}_2$  and  $\text{CH}_3\text{CH}_2\text{Si}(\text{CH}_3)\text{Cl}_2$ . The formation of  $(\text{CH}_3)_3\text{SiH}$  during the pyrolysis of II, and  $\text{Cl}_3\text{SiH}$  and  $\text{CH}_2 = \text{CHCH}_2\text{SiCl}_3$  during the pyrolysis of VII ( $\text{Cl}_3\text{SiCH}_2\text{CH}_2\text{CH}_2\text{SiCl}_3$ ) indicates breaking of the Si-C bond in the disilpropane chain. At the same time, separation of  $\text{CH}_2 = \text{CHSi}(\text{CH}_3)_3$  from products of pyrolysis of II, and  $\text{Cl}_3\text{SiCH}_3$  and  $\text{CH}_2 = \text{CHSiCl}_3$  from VII is due only to the breaking of C-C bond in the bridging groups. It may be said that under the action of high temperatures  $\text{Si}(\text{CH}_2)_n\text{Si}$  ( $n \geq 2$ ) decomposes along Si-C as well as C-C bonds. There are 1 figure, 1 table and 16 references: 6 Soviet-bloc and 10 non-Soviet-bloc. The 4 most recent references to English-language publications read as follows: M. Kumada et alia, J. Org. Chem. 23, 252 (1958); K. Shijna, M. Kumada, J. Org. Chem. 23, 139 (1958); A.I. Barry et alia incl. a. End. Chem. 51, 131 (1959); P.D. George et alia, Chem. Revs. 56, 1074, 1075, 1077 (1956).

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27905

S/079/61/031/010/005/010  
D227/D303

Organosilicon compounds ...

ASSOCIATION: Institut organicheskoy khimii im. N.D. Selinskogo  
Akademii nauk SSSR (Institute of Organic Chemistry  
im. N.D. Selinskiy, Academy of Sciences USSR)

SUBMITTED: September 30, 1960

Card 5/6



88571

S/020/61/136/001/019/037  
B016/B055

5.3700

AUTHORS: ~~Vdovin, V. M.~~, Pushchevaya, K. S., Belikova, N. A.,  
Sultanov, R., Plate, A. F., and Petrov, A. D., Corresponding  
Member AS USSR

TITLE: Derivatives of Silanes With Hydrocarbon Bridges Between the  
Si Atoms. The Polymerization of 1,1-Dimethyl Silicocyclo-  
pentane

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 1, pp. 96-99

TEXT: The authors studied the effect of aluminum halides ( $\text{AlCl}_3$  and  
 $\text{AlBr}_3$  on 1,1-dimethyl silicocyclopentane. They regard the latter as a  
bridge compound in which both ends of the organic radical -R- are attached  
to the same silicon atom. Experimental results confirmed the authors  
assumption that, under the influence of  $\text{AlX}_3$ , the  $\equiv\text{Si} - (\text{CH}_2)_4$  bonds would  
be more reactive than the  $\equiv\text{Si} - \text{CH}_3$  bonds. As expected, this lead to  
formation of a reactive radical  $-\text{Si}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2^-$ , and in the presence

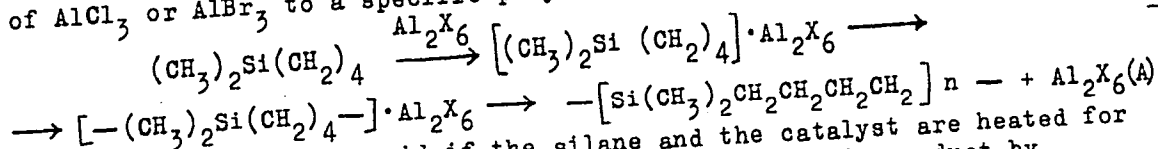
Card 1/3

Derivatives of Silanes With Hydrocarbon Bridges  
Between the Si Atoms. The Polymerization of  
1,1-Dimethyl Silicocyclopentane

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S/020/61/136/001/019/037  
B016/B055

of  $AlCl_3$  or  $AlBr_3$  to a specific polymerization reaction (A):



This reaction is very rapid if the silane and the catalyst are heated for a short time. The authors verified the structure of this product by synthesizing it from corresponding fragments (B). Infrared spectroscopy proved these two products to be identical. Differences between the spectra of these two polymers and that of the monomer are explained by the spacial position of the carbon chains (isomerism). The authors thank Yu. P. Yegorov and Ye. D. Lubush for performing the spectroscopic analyses. Finally the authors discuss the polycondensation of 1,4-ditrimethyl disilyl butane. The reaction product was a colorless, rubbery insoluble polymer similar to the polymerization product obtained in reaction (A). There are 1 figure and 6 Soviet references.

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88571

Derivatives of Silanes With Hydrocarbon Bridges S/020/61/136/001/019/C37  
Between the Si Atoms. The Polymerization of B016/B055  
1,1-Dimethyl Silicocyclopentane

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii  
nauk SSSR (Institute of Organic Chemistry imeni N. D.  
Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: October 1, 1960

Card 3/3

24051  
S/020/61/138/004/011/023  
B103/B203

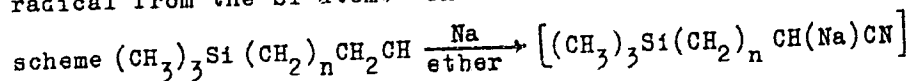
15.8170

AUTHORS: Vdovin, V. M., Sultanov, R., Lubuzh, Ye. D., and Petrov, A. D.,  
Corresponding Member AS USSR

TITLE: Organosilicon compounds with hydrocarbon bridges between the  
silicon atoms. Alkylation of  $\omega$ -cyano-alkyl trimethyl silanes  
by means of halogen methyl trimethyl silanes

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 138, no. 4, 1961, 831-834

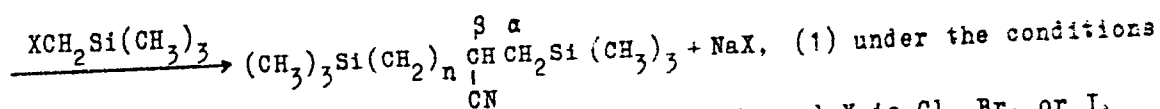
TEXT: The authors studied the production of bridge disilanes  
(CH<sub>3</sub>)<sub>3</sub>Si-R-Si(CH<sub>3</sub>)<sub>3</sub> containing a cyano group in the hydrocarbon radical R.  
Such disilanes may be used for producing various polymers. These compounds  
have so far been obtained with difficulty. The authors point out that the  
cyano group bound to the  $\beta$ -carbon atom (with respect to Si) can be trans-  
formed into various functional groups without separating the cyano-alkyl  
radical from the Si atom. The reaction was conducted according to the



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Organosilicon compounds with hydrocarbon...

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R103/R203



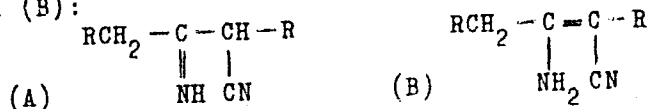
of alkylation of acetonitrile, where n is 1 or 2, and X is Cl, Br, or I. The structure of the compounds obtained was studied by their infrared spectra. The frequency  $2238 \text{ cm}^{-1}$  of disilane nitriles lies in a region characteristic of the cyano group, but is a little lower than its value in  $\omega$ -nitriles  $(\text{CH}_3)_3\text{Si}(\text{CH}_2)_n\text{CN}$  (for n = 2 and 3,  $2249 \text{ cm}^{-1}$ ). This may well be reconciled with the reduction of the frequency of an electronegative group with increasing branching of the radical bound to this group. Besides, the structure of the compounds produced was confirmed by their transformation into ketones. The highest nitrile yield was obtained according to reaction (1) for  $(\text{CH}_3)_3\text{SiCH}_2\text{I}$  (about 40 %). In the case of  $(\text{CH}_3)_3\text{SiCH}_2\text{Cl}$ , the disilane nitrile yield was lowest (about 20 %). In parallel to reaction (1), numerous by-products were formed which corresponded to the dimer of the initial  $\beta$ -cyano-ethyl trimethyl silane. The dimerization of silicon-

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S/O20/61/138/004/011/023  
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Organosilicon compounds with hydrocarbon...

free nitriles under the action of sodium is known, and was confirmed by an additional experiment. From the two structures ascribed to such dimers, (A) and (B):



the authors choose (B) on the basis of spectral data, where  $\text{R} = -\text{CH}_2\text{Si}(\text{CH}_3)_3$ . Here, they find the frequency  $2201 \text{ cm}^{-1}$  (apparatus MKC-12, IKS-12) which they consider to be that of the valency group  $-\text{C}\equiv\text{N}$ . This frequency is reduced, apparently owing to a chain of conjugate groups. The frequencies  $3400$  and  $3448 \text{ cm}^{-1}$  correspond to the symmetric and asymmetric stretching vibrations of the  $\text{NH}_2$  group. In the infrared spectrum of the solution of this substance in  $\text{CCl}_4$ , the frequency  $1630 \text{ cm}^{-1}$  is characteristic of the  $-\text{C}=\text{C}$  bond. The ultraviolet spectrum of this substance showed an intensive frequency  $248 \text{ m}\mu$  ( $E = 46500$ ). In the alkylation of the  $\omega$ -nitrile of the type  $\text{NC}-\text{CH}_2-\text{CH}_2-\text{O}-(\text{CH}_2)_3\text{Si}-(\text{CH}_3)_3$ , a different reaction occurred:

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Organosilicon compounds with hydrocarbon...

$\gamma$ -hydroxy-propyl-trimethyl silane and an acrylonitrile polymer were formed. In a control test (without  $\text{XCH}_2\text{Si}(\text{CH}_3)_3$ ), a  $\gamma$ -alcohol was also formed

according to scheme (4) (a = ether, b = polymer). Decomposition of the systems  $-\text{Y}-\text{C}-\text{C}-\text{C}-\text{M}$  (Y - electronegative, M - electropositive atom) was thoroughly studied by A. N. Nesmeyanov and co-workers (Ref. 14: Izbr. tr. (Selected papers), Izd. AN SSSR, 1959. p. 549, 678, 684), and is a characteristic of these systems if M is a metal. In a special experiment, the authors found that the alcoholate  $(\text{CH}_3)_3\text{Si}(\text{CH}_2)_3\text{ONa}$  formed in the reaction did not react with  $\text{XCH}_2\text{Si}(\text{CH}_3)_3$  under given conditions. There are

1 table and 18 references: 10 Soviet-bloc and 8 non-Soviet-bloc. The three references to English-language publications read as follows: Ref. 8: S. Nozakura, S. Konotsune, Bull. Chem. Soc. Japan, 29, No. 3, 322 (1956); ibid., 29, No. 3, 326 (1956); Ref. 10: R. A. Shaw, J. Chem. Soc., 1956, 2779; Ref. 11: H. Adkins, J. Whitman, J. Am. Chem. Soc., 64, 150 (1942).

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

Card 4/5

30722

S/020/61/141/003/009/021  
B103/B101

15-8170

2209

AUTHORS: Polyakova, A. M., Korshak, V. V., Corresponding Member AS, USSR,  
Vdovin, V. M., and Tambovtseva, Ye. S.

TITLE: Study of the polymerization of cyanogenous organosilicon  
compounds

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 3, 1961, 641-644

TEXT: The polymerizability of cyanogenous alkenyl silane derivatives was studied. These compounds were polymerized (a) under pressure (6000 atm) in the presence of the radical initiators (1) azoisobutyronitrile, (2) tert-butyl peroxide, or (3) benzoyl peroxide; (b) at normal pressure with Pt/C or  $H_2PtCl_6 \cdot 6H_2O$  as catalysts. It was found that cyano-iso-propoxy alkenyl silane derivatives polymerize at comparatively low temperature. Above  $120^\circ C$  these compounds frequently decompose. Only under the conditions of (a) colorless polymers were obtained at  $80^\circ C$ . For the rest, they were yellow to brown. Some of the experiments ended up with explosive polymerization and charring of the products. Most of the products are slightly soluble (Table 1, nos. 1-22). The authors also

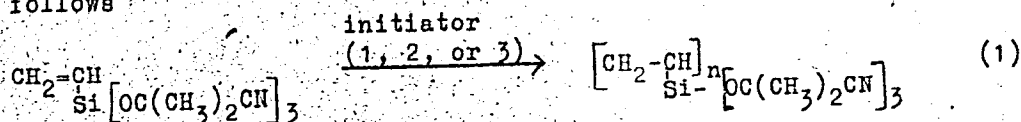
Card 1/6



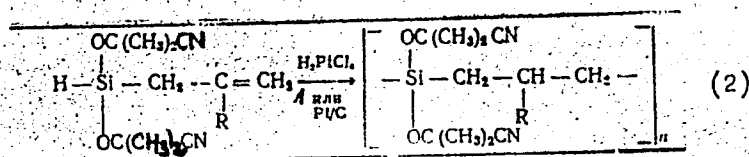
30721 S/O20/61/141/003/009/021  
B103/B101

Study of the polymerization ...

studied the interaction of tetraalkyl dihydro-disiloxane derivatives with cyanogenous diallyl silane derivatives, obtaining oily products. Such products had also been obtained previously (V. V. Korshak et al., DAN, 128, 960 (1959)) by treating dialkyl diallyl silane derivatives with the same disiloxanes. The conversion of the monomers (Table 1), which proceeded without explosive polymerization or charring, is illustrated as follows



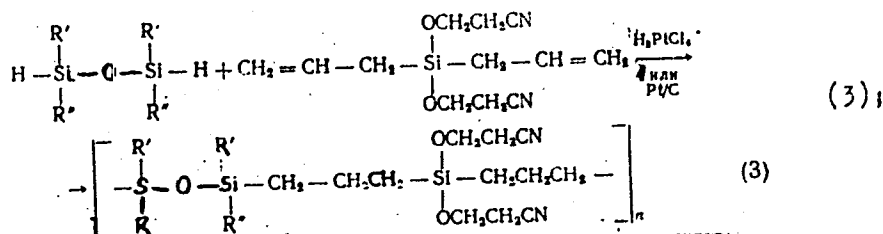
Polymerization of the cyanogenous dialkenyl compounds probably also occurs at the double bonds, possibly involving the formation of cyclic structures



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Study of the polymerization ...

S/020/61/141/003/009/021  
B103/B101



(1) = or. There are 1 table and 9 references: 7 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: J. C. Williams, R. A. Pike, F. Fekete, Ind. and Eng. Chem., 51, 939 (1959); R. M. Savage, Rubber Age, 84, 975 (1959).

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Elemental Organic Compounds of the Academy of Sciences USSR). Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

Card 3/6 3

32303  
S/020/61/141/004/008/019  
B103/B101

15.8170

AUTHORS: Vdovin, V. M., Pushchevaya, K. S., and Petrov, A. D.,  
-Corresponding Member AS USSR

TITLE: Organosilicon compounds with carbon bridges between the  
silicon atoms. Thermal conversions

PERIODICAL: Akademiya nauk SSSR. Doklady. v. 141, no. 4, 1961, 843 -  
846

TEXT: The authors continued their studies on the thermal conversion of  
the  $\text{Si}(\text{CH}_2)_n\text{Si}$  group (Petrov, A. D., Vdovin, V.M. at al.ZhOKh, 31, no. 10  
(1961)) by investigating the effect of temperatures up to  $400^\circ\text{C}$  on com-  
pounds containing a bridge group. They tested substances of the types  
 $(\text{CH}_3)_3\text{Si}-(\text{CH}_2)_n-\text{Si}(\text{CH}_3)_3$  and  $\text{R}(\text{CH}_3)\text{Si}-(\text{CH}_2)_n$  in sealed glass ampullas.  
It has been found that the properties of  $\alpha,\omega$ -hexamethyl disilyl alkanes  
with  $n = 2, 3, 4$  are not modified at  $350 - 360^\circ\text{C}$  by heating for three  
and several hours. This is also true for five and six-membered cyclanes.

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S/020/61/141/004/008/019  
B103/B101

Organosilicon compounds with carbon ...

1,1-dimethyl silico-cyclopentane, for instance, is stable at 390°C for 3 hr. On the contrary, four-membered compounds are polymerized: 1-methyl-1-chloro-silico-cyclobutane beginning from 170 - 180°C and 1,1-dimethyl silico-cyclobutane beginning from 125 - 130°C. Thereby solid elastic substances are formed which are soluble in the initial monomer as well as in benzene and chloroform. The polymers of an elementary composition similar to that of the initial silico-cyclobutanes have the same infrared spectra (ИКС-10(ИКС-10) apparatus), if they are produced by the reactions  $[(I)]$  or  $[(II)]$  (1 = or). On the other hand, the spectrum of the polymer from 1,1-dimethyl silico-cyclobutane differs from that of a (B) structure polymer. Therefore the structure (A) was attributed to the former polymer. Control tests have shown that at 180 - 200°C  $H-Si(CH_3)(R)-CH_2CH=CH_2$  is not polymerized noticeably, whereas  $Cl(CH_3)_3Si-(CH_2)_3$  is completely polymerized. Compounds with Si-H bonds are completely absent in the monomer distilled after incomplete polymerization. The different behavior of silico-cyclobutanes as compared to that of five and six-membered silico-cyclanes at elevated temperatures may be due to the tension of the four-

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Organosilicon compounds with carbon ...

membered ring. By thermal polymerization of silico-cyclobutanes very high-molecular products are obtained; this is not so, when linear polymers of the  $\left[ \text{CH}_2\text{CH}_2\text{CH}_2\overset{\text{R}}{\underset{\text{R}}{\text{Si}}} \right]$  type are produced by other methods. Raman spectra of the two cyclanes used were taken by means of an MCP-51 (ISP-51) apparatus. They did not show frequencies of the Si-H or C-C bonds. Presumably, the silico-cyclobutane group is characterized by both a very intense line in the range  $430 - 450 \text{ cm}^{-1}$  and lines in the ranges 725, 815, 878, 903, 927, and  $1125 \text{ cm}^{-1}$ . In the Raman spectrum of allyl-methyl chlorosilane the Si-bound allyl group is characterized by the frequencies: 407, 940, 995, 1165, 1300, 1392, 1635, 3003, and  $3080 \text{ cm}^{-1}$ , whereas the line  $2175 \text{ cm}^{-1}$  characterizes the  $\equiv\text{Si-H}$  bond. The polymer  $\left[ \text{Cl}(\text{CH}_3)\text{SiCH}_2\text{CH}_2\text{CH}_2 \right]_n$  was obtained by heating  $\text{CH}_2=\text{CHCH}_2\text{SiCl}(\text{CH}_3)_2$  dissolved in isopropanol with a slight admixture of  $\text{H}_2\text{PtCl}_6$  up to  $80^\circ\text{C}$ . This polymer is a brittle paraffinoid mass with boiling point of  $60 - 65^\circ\text{C}$ ,  
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S/020/61/141/004/008/019  
B103/B101

Organosilicon compounds with carbon ...

which is readily soluble in benzene and  $\text{CCl}_4$ . The yield was about 60%.

The polymer of 1-methyl-2-chloro-silico-cyclobutane obtained at  $230^\circ\text{C}$  is a transparent rubber-like substance which hydrolyzes in air. L. A. Leytes is thanked for making the spectrum analyses. There are 13 references: 8 Soviet and 5 non-Soviet. The three most recent references to English-language publications read as follows: Ref. 5: L. H. Sommer et al., J. Am. Chem. Soc., 79, 3295 (1957); Ref. 6: C. Earborn, Organosilicon Compounds, London, 1960, p. 370; Ref. 10: R. West, J. Am. Chem. Soc., 76, 6012 (1954).

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy, AS USSR)

SUBMITTED: August 17, 1961

Card 4/4

4  
POLYAKOVA, A.M., SUCHKOVA, M.D., VDOVIN, V.M., NAMETKIN, N.S.,  
PRINTULA, H.A.

Silicon-organic compound with alternating siloxane and  
carbon elements.

Report presented at the 12th Conference on high molecular weight compounds  
devoted to monomers, Baku, 3-7 April 62

VDOVIN, V.M.; NAMETKIN, N.S.; PUSHCHEVAYA, K.S.; TOPCHIYEV, A.V.

Expansion reaction of a heterocyclic compound having a silicon atom in its cycle. Izv.AN SSSR. Utd.khim.nauk no.6:1127 '62. (MIRA 15:8)

1. Institut neftekhimicheskogo sinteza AN SSSR.  
(Silicon organic compounds)



S/074/62/031/007/001/001  
1001/I201

AUTHORS: Vdovin, V.M. and Petrov, A.D.

TITLE: Silicon-organic compounds containing the CN group

PERIODICAL: Uspekhi Khimii, v.31, no.7, 1962, 793-821

TEXT: Review of international and Soviet works on synthesis of CN-containing silicon-organic compounds: I. Introduction; II. Compounds with a CN group bound directly to silicon atom: 1. Methods of synthesis, 2. Properties. III. Silicon organic compounds with cyanalkyl and cyanaryl radicals: 1. Methods of synthesis; 2. Chemical properties, 3. Physical properties; 4. Use of alkylcyanogen compounds of silicon; IV. Cyanalkoxyderivatives of silicon organic compounds: 1. Methods of synthesis, 2. Properties. There are 1 figure, 9 tables and 157 references. ✓

ASSOCIATION: Institut organicheskoy khimii AN SSSR im N.D. Zelinskogo (Institute of organic chemistry AS USSR, im. N.D. Zelinskiy)

Card 1/1

35522  
S/020/62/143/003/019/029  
B110/B101

11.9200

AUTHORS:

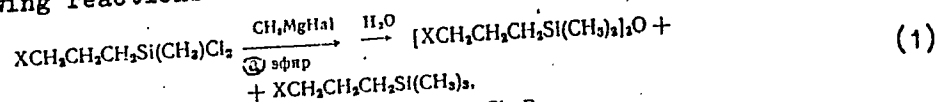
Petrov, A. D., Corresponding Member AS USSR, Vdovin, V. M.,  
and Sultanov, R.

TITLE:

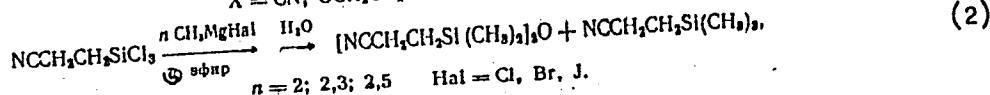
Synthesis and conversions of  $\alpha,\omega$ -di-(alkyl cyanide)  
tetramethyl disiloxanes

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 185, no. 3, 1962, 606-609

TEXT: The production of  $\alpha,\omega$ -di-(alkyl cyanide)-tetramethyl siloxanes  
according to A. D. Petrov et al. (DAN, 128, no. 6 (1959)) was studied.  
The following reactions were carried out:



X = CN, OCH<sub>2</sub>CH<sub>2</sub>CN Hal = Cl, Br;



n = 2, 2,3; 2,5 Hal = Cl, Br, I.

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B110/B101

## Synthesis and conversions of ...

(a = ether). During reaction (2) in ethereal medium between -3 and 36°C, optimum yields of  $\alpha,\omega$ -dinitrile were obtained at Hal = Cl and n = 2.5. At n = 2, no large amounts of  $\alpha,\omega$ -di-( $\beta$ -ethyl cyanide) tetramethyl disiloxane were obtained owing to the high rate of substitution at room temperature of all three Cl atoms at silicon from the compound  $\text{NCCH}_2\text{CH}_2\text{SiCl}_3$ . Owing to the formation of  $\text{NCCH}_2\text{CH}_2\text{Si}(\text{CH}_3)_3$ , a considerable part of bifunctional nitrile  $\text{NCCH}_2\text{CH}_2\text{Si}(\text{CH}_3)\text{Cl}_2$  remains in the mixture.

This reacts, during the hydrolysis, with the monofunctional  $\text{NCCH}_2\text{CH}_2\text{Si}(\text{CH}_3)_2\text{Cl}$  and forms linear polysiloxanes with the presumable structure  $\text{NCCH}_2\text{CH}_2\text{Si}(\text{CH}_3)_2\text{O}[\text{NCCH}_2\text{CH}_2(\text{CH}_3)\text{SiO}]_k\text{Si}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{CN}$ . The first link of this series with k = 1 was separated in all experiments. The  $\alpha,\omega$ -di-(alkyl cyanide)-tetramethyl disiloxanes obtained were copolymerized with dimethyl silicon cyclopolysiloxanes at  $20 \pm 2^\circ\text{C}$  by means of 2-6% by weight of concentrated  $\text{H}_2\text{SO}_4$ . According to M. Prober

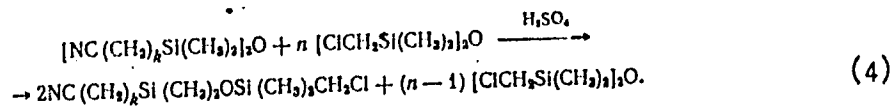
(see below), cyclic polysiloxanes with  $\alpha$ -alkyl cyanide radicals separate the cyanide radical under the given conditions and form crosslinked polymers. The linear  $\alpha,\omega$ -di-(alkyl cyanide) dimethyl polysiloxanes

Card 2/4

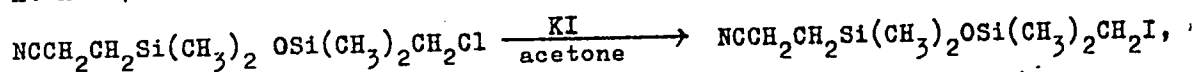
S/020/62/143/003/019/029  
B110/B101

Synthesis and conversions of ...

produced were highly viscous liquids. Their viscosity index was close to that of dimethyl polysiloxanes. In a similar way, disiloxanes with reactive CN-alkyl- and Cl-alkyl groups were obtained:



At  $n = 7$  chloro nitriles with 70-90% yield were obtained. According to:



the iodide was produced with 83% yield. There are 2 tables. The most important English-language reference is: M. Prober, J. Am. Chem. Soc., 77, 3224 (1955).

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

Card 3/4

Synthesis and conversions of...

S/020/62/143/003/019/029  
B110/B101

SUBMITTED: December 11, 1961

40

45

50

Card 4/4

VDOVIN, V.M., ZAVYALOV, V.L., PUSHCHEVAYA, K.S.; NAMETKIN, N. S.;

"Umwandlungen von silicium kohlenstoff heterozyklen mit Si im ring  
unter einwirkung von  $AlCl_3$ ."

"Conversion of Si-C heterocycles containing Si in the ring under the  
influence of  $AlCl_3$ ."

Report submitted to the 2nd Dresden Symp. on Organic and Non-Silicate  
Silicon Chemistry.  
Dresden, East Germany

26-30 March 1963

NAMETKIN, N.S., FINKELSHTEYN, Y. SH. VDOVIN, V.M.

"Die alkydierung aromatischer verbindungen mit silico-olefinen."

Report submitted to the 2nd Dresden Symp. On Organic and Non-Silicate  
Silicon Chemistry.

Dresden, East Germany

26-30 March 1963

NAMETKIN, N.S., VDOVIN, V.M.

Procede nouveau pour la preparation des polymeres silaniques constitues  
par des atomes de carbone et de silicium dans les chaines principales.

Report submitted at the International Symposium of Macromolecular Chemistry  
Paris, 1-6 July 63



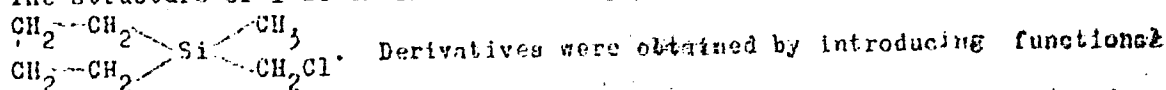
S/062/64/000/002/010/020  
B144/B106

AUTHORS: Vdovin, V. K., Nametkin, N. S., Pushchevaya, K. S., and  
Topchiyev, A. V. (Deceased)

TITLE: Synthesis and conversions of 1-chloro-methyl-1-methyl silico-  
cyclopentane

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh  
nauk, no. 2, 1963, 274 - 281

TEXT: 1-chloro-methyl-1-methyl silico-cyclopentane (I) (b.p. 168.5°C,  
 $n_D^{20}$  1.4738,  $d_4^{20}$  0.9893) was synthesized from chloro-methyl-methyl-dichloro  
silane and  $\text{BrMg}(\text{CH}_2)_4\text{MgBr}$  in 50% yield. It was used as the initial sub-  
stance for the synthesis of new derivatives with carbofunctional radicals.  
The structure of I determined from IR spectra was



groups into the methyl radical by nucleophilic substitution of Cl. 1-iodo-  
methyl-1-methyl silico-cyclopentane was synthesized from I, KI and acetone  
Card 1/3

Synthesis and conversions of...

8/062/63/000/000/010/020  
B144/B186

by boiling for 24 hrs; b.p. 93.5°C,  $n_D^{20}$  1.5383,  $d_4^{20}$  1.4973, yield 89%.

1-thiocyano-methyl-1-methyl silico-cyclopentane was obtained from I and KSCN;

b.p. 108 - 110°C,  $n_D^{20}$  1.5110,  $d_4^{20}$  1.0295, yield 78 %. Reacting I with

potassium acetate yielded 1-acetoxy-methyl-1-methyl silico-cyclopentane;

b.p. 96 - 97°C,  $n_D^{20}$  1.4550,  $d_4^{20}$  0.9675, yield 64.5%. The differing proper-

ties of I and the 1-chloro-methyl-1-methyl silico-cyclopentane obtained from

1,1-dimethyl silico-cyclopentane by R. Fessenden, F. J. Freenor (J. Organ.

Chem., 26, 2003 (1961)) are attributed to a different isomeric structure:

$\begin{array}{c} \text{CH}_2-\text{CH}_2-\text{Si}-\text{CH}_3 \\ | \quad | \quad | \\ \text{CH}_2-\text{CH}_2-\text{Cl} \end{array}$ . Reaction with  $\text{AlCl}_3$  produced a widening of the ring with

formation of 1-chloro-methyl silico-cyclohexane; b.p. 156.7°C,  $n_D^{20}$  1.4613,

$n_4^{20}$  0.9847, yield 31 %. The structure was established spectrometrically

based on the 797, 912, and 1014  $\text{cm}^{-1}$  bands characteristic of the silico-

cyclohexane ring:  $\begin{array}{c} \text{CH}_2-\text{CH}_2-\text{Si}-\text{CH}_3 \\ | \quad | \quad | \\ \text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{Cl} \end{array}$  and titration with KOH proved the

Card 2/3

Synthesis and conversions of...

2/062/63/000/002/010/020  
B144/B156

presence of the Si-Cl bond. The widening of an Si-containing heterocyclic ring has been achieved for the first time. Under the effect of  $H_2SO_4$  the ring of I was opened and a disiloxane formed.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk USSR  
(Institute of Petrochemical Synthesis of the Academy of Sciences USSR)

SUBMITTED: May 17, 1962

Card 3/3

L 11226-63

EPF(c)/EWP(j)/EWT(m)/BDS--AFFTC/ASD--Pr-h/Pc-h--RM/MAY/WW

72  
71

ACCESSION NR: AP3000123

S/0062/63/000/005/0822/0831

AUTHOR: Yegorov, Yu. P.; Pushchevaya, K. S.; Lubuzh, Ye. D.; Vdovin, V. M.; Petrov, A. D.

TITLE: Organosilicon compounds with hydrocarbon bridges between the silicon atoms

SOURCE: AN SSSR. Izvestiya otdeleniye khimicheskikh nauk, no. 6, 1963, 822-831

TOPIC TAGS: organosilicon compounds, polycondensation, polymerization, polymer, structure, IR spectroscopy, aluminum chloride, aluminum bromide

ABSTRACT: The feasibility of synthesizing polymers having alternating p-xylylene or p-phenylene radicals and silicon atoms in the backbone by the polycondensation of 1,4-bis(trimethylsilyl)xylylene or 1,4-bis(trimethylsilyl)phenylene in the presence of an  $Al_2Cl_6$  or  $Al_2Br_6$  catalyst has been established. The structure of previously prepared products of the catalytic polycondensation of various  $\alpha,\omega$ -bis(trimethylsilyl)alkanes as well as of the thermal polymerization of 1,1-dimethylsilacyclopentane and 1,1-dimethylsilacyclobutane have been studied by IR spectroscopy. The structure of the polymer of 1,1-dimethylsilacyclopentane,

Card 1/2/

NAMETKIN, N.S.; VDOVIN, V.M.; PUSHCHEVAYA, K.S.

Catalytic reactions involved in the formation of 1,1-dimethyl-  
silicocyclopentane. Dokl. AN SSSR 140 no.3:562-565 My '63.  
(MIRA 16:6)

1. Institut neftekhimicheskogo sinteza AN SSSR. 2. Chlen-  
korrespondent AN SSSR (for Nametkin).  
(Silicon organic compounds)  
(Catalysis)

L 13007-63

EPF(c)/EWP(j)/EWT(m)/BDS

AFFTC/ASD Pc-4/Pr-4

RM/WW/MAY

ACCESSION NR: AP3001403

S/0020/63/150/004/0799/0801

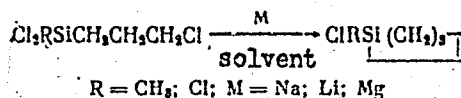
AUTHOR: Vdovin, V. M.; Nametkin, N. S. (Corresponding Member of Academy of Sciences, SSSR); Grinberg, P. L.

TITLE: Cyclobutanesilicates. The synthesis of 1,1-substituted cyclobutanesilicates

SOURCE: AN SSSR. Doklady, v. 150, no. 4, 1963, 799-801

TOPIC TAGS: Synthesis of 1-chlor-1-methylcyclobutanesilicate, synthesis of 1-methyl-1-benzylcyclobutanesilicate, 1-ethyl-1-methylcyclobutanesilicate

ABSTRACT: The study of metalloorganic reactions of  $\gamma$ -chloropropyl silicate derivatives of the type



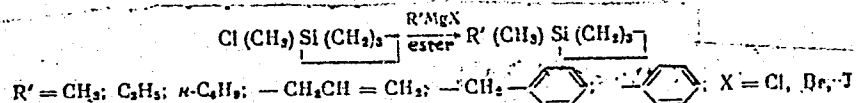
showed that the reaction with the non-activated magnesium in ether resulted in very low yields of cyclobutylsilicates (10%). However, good yields of cyclobutylsilicates were obtained when using magnesium activated with iodine vapors. Further

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ACCESSION NR: AP3001403

preparations of cyclobutylsilicates were made using alkyl, aryl, alkenyl and alkyl-aryl substitutions on the silica:



The synthesis of 1-chlor-1-methyl-cyclobutanesilicate, 1-methyl-1-benzylcyclobutanesilicate, and 1-ethyl-1-methylcyclobutanesilicate was obtained from hydrosilanes and alyl chlorides with the use of  $\text{H}_2\text{PtCl}_6$  catalyst. Orig. art. has: 2 tables.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR (Institute of Petrochemical Synthesis, Academy of Sciences, SSSR)

SUBMITTED: 12Feb63

DATE ACQ: 01Jul63

ENCL: 00

SUB CODE: 00

NO REF SOV: 008

OTHER: 006

Card 2/2

L 22662-65 EPF(c)/EWP(j)/EWI(m)/T Po-1/Pr-4 RM/MLK  
 S/0000/64/000/000/0091/0096  
 ACCESSION NR: AT5002115

AUTHOR: Polyakova, A. M.; Suchkova, M. D.; Vdovin, V. M.

TITLE: Synthesis of organosilicon compounds with alternating siloxane (or silane) and carbon members

SOURCE: AN SSSR. Institut neftekhimicheskogo sinteza. Sintez i svoystva monomerov (The synthesis and properties of monomers). Moscow: Izd-vo Nauka, 1964. 91-96

TOPIC TAGS: silicoorganic compound; siloxane polymer; silane polymer; oligomer synthesis

ABSTRACT: A general method is proposed for the synthesis of organosilicon oligomers, the main chain of which consists of alternating hydrocarbon and siloxane fragments. The method involves the reaction of  $\alpha$ ,  $\omega$ -dihydro polysiloxanes (and dihydrosilanes) with acetylene and non-conjugated diolefins in the presence of platinum catalysts. The structure of the oligomers was demonstrated with the aid of infrared absorption spectra, using the absorption bands of the valence oscillations of terminal H-Si ( $2100-2150 \text{ cm}^{-1}$ ) and C-C ( $1595-1600 \text{ cm}^{-1}$ ) bonds. In order to evaluate the structures containing terminal vinyl groups, use was also made of absorption bands of the asymmetric valence oscillations of

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L 22662-65  
ACCESSION NR: AT5002115

the terminal  $-\text{CH}_2-$  groups ( $3050\text{ cm}^{-1}$ ). The presence of  $-\text{CH}=\text{CH}_2-$  and  $\text{H}-\text{Si}-$  groups in the molecules of the oligomers was also demonstrated chemically. Reactions on the terminal groups of the resulting oligomers ( $\text{Si}-\text{H}$  and  $\text{Si}-\text{alkene}$ ) and functional groups contained in the hydrocarbon chain ( $=\text{N}-\text{H}$ ) resulted in solidification of the oligomers into trimeric products. Orig. art. has: 3 tables and 5 formulas.

ASSOCIATION: None

SUBMITTED: 30Jul64

ENCL: 00

SUB CODE: OC, 6C

NO REF SOV: 004

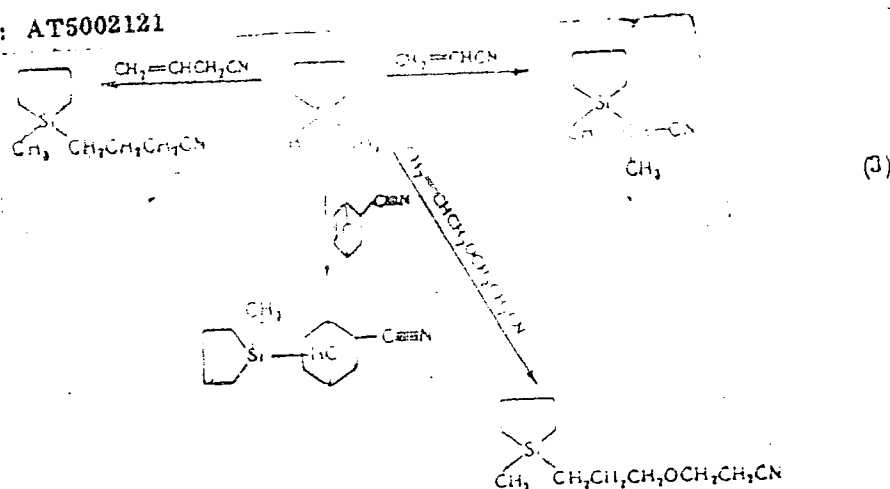
OTHER: 001

Card 2/2



L 40558-85

ACCESSION NR: AT5002121



As a result of the study, a great number of new cyano-alkyl monomers with 1, 2 or 3 cyano-alkyl groups on the silicon atom were prepared. Unidentified individually in the present study, these investigated combine to

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SUBMITTED: 30Jul64

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SUB CODE: OC

NO REF SOV: 011

OTHER: 004

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